

# JOURNAL of the American Veterinary Medical Association

FORMERLY  
**AMERICAN VETERINARY REVIEW**

(Original Official Organ U. S. Vet. Med. Ass'n.)

EDITED AND PUBLISHED FOR

The American Veterinary Medical Association

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Communications relating to publication, subscriptions, advertisements and remittances for the JOURNAL OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION, as well as matters pertaining to the American Veterinary Medical Association and membership, should be sent to Dr. H. Preston Hoskins, Secretary-Editor, 537 Book Bldg., Detroit, Mich.

\$4.00 per annum

Foreign \$5.00; Canada \$4.25

Single Copies 40 cts. in U. S.

**I**NCREASING the extent of early immunization through professional service has been the objective of several seasons of "Corn States" publicity, using both the medium of booklet information and the farm press.

**T**HE 1930 campaign is under way and promises to be of more than usual interest. Hog-raisers are being invited, through the farm press, to compete for the prize of having their pigs vaccinated free, in a letter-writing contest on the subject, "What are the most profitable things to do in raising pigs from birth to twelve weeks of age?"

**T**HE principal restrictions are that the work of vaccination be done by a graduate veterinarian, and before August 1. No restriction as to kind of serum and virus used.

**F**OLDERS are available to graduate veterinarians for distribution to their clientele. If you would participate in the benefits of this campaign, write for a supply of folders.

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**JOURNAL**  
**OF THE**  
**American Veterinary Medical Association**  
**FORMERLY AMERICAN VETERINARY REVIEW**

(Original Official Organ U. S. Vet. Med. Ass'n.)

H. Preston Hoskins, Secretary-Editor, 537 Book Building, Detroit, Mich.

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Reprints should be ordered in advance. Prices will be sent upon application.

Vol. LXXVII, N. S. Vol. 30

July 1930

No. 1

**ON TO LOS ANGELES**

For the third time in the history of the A. V. M. A., an annual convention will be held in California. The first meeting in the Golden State was held at San Francisco, in 1910. Five years later, the second California conclave was convened at Oakland. It will be seen, therefore, that fifteen years have elapsed since an A. V. M. A. convention was held in California. As was pointed out last year, by those who urged the members to vote for Los Angeles, this metropolis is the largest city in the United States that has never entertained an A. V. M. A. convention. This particular distinction, if it may be so designated, now passes to Baltimore, Maryland, which, according to latest census estimates, is our eighth city.

The California veterinarians are hard at work with the plans for entertaining. These plans provide for an estimated attendance of one thousand. There are approximately six hundred veterinarians in California, according to the latest available information. Most of these can be counted upon to attend the convention, the first such opportunity that the majority have had in fifteen years. Other Pacific and Rocky Mountain states will contribute their quotas and these, added to the regulars from eastern points, who attend no matter where the meeting is held, should put the attendance figure close to the thousand mark, if not above it.

One of the features of the convention will be the educational exhibits, in charge of Drs. G. W. Blanche and J. G. Townsend. Special booths will be provided for cattle exhibits, poultry, small animals and so forth. It is quite likely that one afternoon, heretofore given over to a general business session, will be set aside for trips to veterinary hospitals, dairies, stock farms and other places of interest.

As usual, the alumni of the different veterinary colleges will get together Tuesday evening for their annual meetings. The management of the Ambassador Hotel has agreed to provide special entertainment for that night. The President's reception



Ambassador Hotel, Los Angeles, seen from the air.

and dance will probably be held the same evening as the banquet (Wednesday). Will Rogers has been invited to attend the banquet. Special entertainment is being arranged for Friday evening, heretofore a breathing space in A. V. M. A. convention programs.

On Friday a clinic will be held at the Los Angeles stock yards. A barbecue luncheon will be served at noon, with special entertainment features. A swimming carnival is scheduled for later in the afternoon.

As usual, the ladies will be kept on the move all week. A peep at the tentative program revealed the following events: a sports buffet tea, a theatre party, a trip to Catalina Island, a sight-seeing ride and the other features provided jointly with the gentlemen, such as the banquet, reception and dance.

The officers of the five sections in the A. V. M. A. have been busy as bees with their plans for the literary program. Thanks to the cooperation given by the section secretaries, we are able to list this month a few of the papers that will be presented. The complete list of papers will be published in the August issue. The Occurrence of *B. Sordelli* in Animals—Dr. L. R. Vawter, University of Nevada, Reno, Nevada.

Liver Fluke Investigations—Dr. J. N. Shaw, Oregon Agricultural College, Corvallis, Oregon.

Tuberculosis Control in California—Dr. J. P. Iverson, State Veterinarian, Sacramento, Calif.

Anthrax—Dr. E. R. Derfingier, State Live Stock Sanitary Board, Salem, Oregon.

Disease Conditions in Various Parts of the World—Dr. George W. Pope, U. S. Bureau of Animal Industry, Washington, D. C.

Precipitation Tests to Detect Horse Meat and Veal Adulteration of Beef and Pork Sausage—Dr. F. M. Bolin, Oregon Agricultural College, Corvallis, Oregon.

Tularemia—Dr. James Dade, Boise, Idaho.

Coccidiosis and Lamb Dysentery—Dr. Hadleigh Marsh, Montana Agr. Exp. Station, Bozeman, Montana.

Actinobacillosis—Dr. A. J. Damman, Vancouver, Brit. Col.

Recent Advances in the Prophylaxis and Treatment of Canine Distemper—Dr. F. W. Wood, The Cutter Laboratory, Berkeley, Calif.

Clinical Manifestations of Pathological Conditions of the Genital Organs—Dr. James B. Jones, West Hollywood, Calif.

Hospitalizations of Small Animal—Dr. W. E. Frink, Los Angeles, Calif.

Normal Saline Solution in Canine Practice—Dr. H. Calvin Rea, Charlotte, North Carolina.

Canine Obstetrics and Parturition Diseases—Dr. H. A. Gould, Hollywood, Calif.

Care and Feeding of Small Animals in a Zoological Park—Dr. C. V. Noback, New York Zoological Park, New York, N. Y.

Canine Dentistry and Diseases of the Mouth—Dr. E. A. Ehmer, Seattle, Wash.

Bulla-osteotomy in the Dog—Drs. G. W. McNutt and J. E. McCoy, State College of Washington, Pullman, Wash.

Accuracy of Three Cooperating Laboratories in Detecting Pullorum Disease by Agglutination Test—Dr. J. Biely, University of British Columbia, Vancouver, Brit. Col.

Some Recent Studies in Poultry Diseases—Dr. George Kernohan, University of California, Petaluma, Calif.

Studies in the Pathology of Avian Coccidiosis—Dr. H. J. Stafseth, Michigan State College, East Lansing, Mich.

The Chemist's Viewpoint of Live Stock Nostrums—Dr. J. H. Weiner, Kansas City, Mo.

Veterinary Problems on Fur Farms—Dr. J. E. Shillinger, Bureau of Biological Survey, Department of Agriculture, Washington, D. C.

- The Museum of Pathology—A Neglected Institution—Dr. William H. Feldman, Mayo Foundation, Rochester, Minnesota.
- Coccidioid Granuloma in Animals—Dr. Jacob Traum, University of California, Berkeley, Calif.
- Histological Studies on A-Avitaminosis and Coryza in Chickens—O. Seifried, Rockefeller Institute, Princeton, New Jersey.
- Histopathology of the Central Nervous System in Hog Cholera—O. Seifried, Rockefeller Institute, Princeton, New Jersey.
- The Bacillus of Swine Erysipelas Associated with Arthritis in Lambs—Dr. Hadleigh Marsh, Agricultural Experiment Station, Bozeman, Montana.
- Chloroform-Treated Rabies Vaccine—Major R. A. Kelsner, Army Medical School, Washington, D. C.
- Studies in Avian Laryngo-tracheitis—Drs. Robert Graham, Frank Thorp, Jr., and W. A. James, University of Illinois, Urbana, Ill.
- Correlation of Blood Reactions Over a Period of Years with the Breeding Records in an Abortion-Infected Herd of Cattle—Dr. C. F. Clark, Michigan State College, East Lansing, Mich.
- Enteritidis Infection and Pseudo-Tuberculosis in Laboratory Animals—C. A. Mitchell and R. C. Duthie, Animal Diseases Research Institute, Hull, Quebec.
- The Pacific Coast Co-operative Abortion Project—Dr. C. M. Haring, University of California, Berkeley, Calif.
- Coccidiosis in Poultry—W. T. Johnson, Oregon Agricultural College, Corvallis, Oregon.
- Fertility in Bulls—Drs. C. R. Donham and B. T. Simms, Oregon Agricultural College, Corvallis, Oregon.
- Further Studies on Salmon Poisoning in Dogs—Drs. C. R. Donham, B. T. Simms, J. N. Shaw and A. M. McCapes, Oregon Agricultural College, Corvallis, Oregon.
- The Nutritional Requirements of Growing Animals—Prof. W. F. Holst, University of California, Berkeley, Calif.
- The Incidence of *B. Abortus* Agglutinins in Human Sera—Dr. R. A. Whiting, Research Institute of the Zoological Society of San Diego, San Diego, Calif.

### APPLICATIONS FOR MEMBERSHIP

Everything considered, applications for membership have been coming in at a satisfactory rate. The number received this year will not equal the number received last year by considerable margin. Last year was an exceptional year, with approximately 650 new members added to the roll.

Years when the meeting is held in extreme parts of the country are usually off years. The present year is no exception. Just how much effect the business depression of the past six months will have on A. V. M. A. activities is difficult to estimate. It would take the most rabid sort of an optimist to believe that any organization the size of ours would not be affected. The number of members whose dues remain unpaid by the time of the Los Angeles convention will shed some light on the question, possibly more reliable than the number of new members admitted this year.

With 32 applications listed this month, the total for the year is brought up to 181. Wisconsin, the home of President Ferguson, is in the lead with 20 applications filed. California is next with 18, and Illinois and Ohio follow, with 14 apiece. Kansas has 11 and Missouri 9. It is very gratifying to note that more than one-half of the applicants listed below are 1930 graduates. Ohio State University leads with ten members of the graduating class seeking admission to the A. V. M. A.

Remember the regulations governing the admission of new members. The following is quoted from the By-laws:

Applications for membership shall be made upon blanks furnished by the Association, in the handwriting of the applicant, and must be endorsed by two members of the Association in good standing, one of whom must be a resident of the state, province or territory in which the applicant resides. Applications must be accompanied by a membership fee of \$5.00 and dues pro rata for the balance of the fiscal year current, as stated on the application blank. Applications must be filed with the Secretary and examined by him for correctness and completeness as far as available information will allow. After such approval by the Secretary, the latter will cause to be published in the official JOURNAL, as soon thereafter as possible, said application with name and address of the applicant, college and year of graduation, and names of vouchers. If no objections shall be filed with the Secretary, as against the applicant being admitted to membership in the Association, his name shall again be listed in the next issue of the JOURNAL, and if no objections shall have been filed within thirty days after the second publication of the name of the applicant, he shall automatically become a member and shall be so enrolled by the Secretary and membership card issued. If any objections be filed against any applicant, either on first or second notice, said application will be referred to the Executive Board for consideration.

#### FIRST LISTING

- ANDERSON, WALTER RAYMOND R. 3, Box 70, Worthington, Minn.  
D. V. M., Iowa State College, 1930  
Vouchers: Geo. R. Fowler and H. E. Bemis.
- BAKER, DONALD WYCKOFF Cornell University, Ithaca, N. Y.  
B. S. Rutgers University, 1925  
D. V. M., Cornell University, 1929  
Vouchers: C. E. Hayden and P. A. Fish.
- BARTLETT, DENSIL CLYDE R. R. No. 1, Mount Vernon, Ohio  
D. V. M., Ohio State University, 1930  
Vouchers: W. F. Guard and Walter R. Krill.
- BOWEN, ABRAM TEMPLE Montvale, N. J.  
V. M. D., University of Pennsylvania, 1930  
Vouchers: G. A. Dick and John B. Hopper.
- BRAUN, EDWARD ROBERT 722 E St., Eureka, Calif.  
D. V. M., Washington State College, 1929  
Vouchers: John L. Masson and M. E. Anderson.
- BRIGGS, MERTON LORENZO 525 Benson St., Camden, N. J.  
V. M. D., University of Pennsylvania, 1930  
Vouchers: Wm. J. Lentz and G. A. Dick.
- COBB, TROY BENTON Adel, Ga.  
D. V. M., Georgia State College of Agriculture, 1928  
Vouchers: E. D. King, Jr. and A. G. G. Richardson.
- CRAGO, CHARLES CLARENCE 598 South St. S. E., Warren, Ohio  
D. V. M., Ohio State University, 1930  
Vouchers: W. F. Guard and Walter R. Krill.

- ECHOLS, BYRON C. 101 Mission Drive, San Gabriel, Calif.  
V. M. D., Indiana Veterinary College, 1907  
Vouchers: L. E. Pike and C. E. Wicktör.
- EICHHORN, HERBERT J. Edison, Ohio  
D. V. M., Ohio State University, 1930  
Vouchers: W. F. Guard and Walter R. Krill.
- HISEL, CLARENCE C. 209 W. 20th St., Oklahoma City, Okla.  
D. V. M., Kansas City Veterinary College, 1916  
Vouchers: L. J. Allen and W. L. Hiatt.
- HORSTMAN, CARL H. Jackson, Minn.  
D. V. M., Iowa State College, 1930  
Vouchers: Geo. R. Fowler and H. E. Bemis.
- HUGGLER, GEORGE WILLIAM State Road, Paoli, Pa.  
V. M. D., University of Pennsylvania, 1930  
Vouchers: Clarence J. Marshall and H. E. Bemis.
- JEROME, GEO. R. F. D. 5, Box 129 E, West Allis, Wis.  
V. S., Ontario Veterinary College, 1898  
M. D. V., McKillip Veterinary College, 1901  
Vouchers: A. E. Behnke and T. H. Ferguson.
- JOHNSON, LESLIE EDWIN Melvin, Ill.  
D. V. M., Ohio State University, 1930  
Vouchers: W. F. Guard and Walter R. Krill.
- KEAGY, HILAN FRANKLIN 2121 Pico Blvd., Santa Monica, Calif.  
D. V. M., Colorado Agricultural College, 1930  
Vouchers: Geo. H. Glover and I. E. Newsom.
- LEASURE, THOMAS J. Solomon, Kans.  
D. V. M., Kansas State Agricultural College, 1930  
Vouchers: Joseph P. Scott and Herman Farley.
- MCALISTER, RANCIE GROVER General Delivery, Los Angeles, Calif.  
D. V. M., Washington State College, 1909  
Vouchers: W. L. Curtis and J. P. Bushong.
- MOORE, EARL N. c/o Oglebay Hall, Univ. of W. Va., Morgantown, W. Va.  
D. V. M., Ohio State University, 1930  
Vouchers: W. F. Guard and Walter R. Krill.
- MUELLER, CHARLES E. Ogallala, Nebr.  
D. V. M., Colorado Agricultural College, 1929  
Vouchers: I. E. Newsom and Bernhard Witt.
- OGDEN, WILBURN O. Hominy, Okla.  
D. V. M., Arkansas Veterinary College, 1919  
Vouchers: Joe H. Bux and H. Wood Ayers.
- ORR, AQUILLA E. 504 N. Mt. Olive St., Siloam Springs, Ark.  
V. S., Ontario Veterinary College, 1888  
Vouchers: Joe H. Bux and F. R. Osborn.
- OTIS, GEORGE M. 1674 Kinnickinnic Ave., Milwaukee, Wis.  
M. D. C., Chicago Veterinary College, 1903  
Vouchers: A. E. Behnke and T. H. Ferguson.
- PAVEY, WILLIAM HUGH Sabina, Ohio  
D. V. M., Ohio State University, 1930  
Vouchers: W. F. Guard and Walter R. Krill.
- RUNNELS, CHARLES FOREST 88 S. 3rd St., Newark, Ohio  
D. V. M., Ohio State University, 1930  
Vouchers: W. F. Guard and Walter R. Krill.
- SEITZ, PALACE H. 439 E. Main St., Dallastown, Pa.  
V. M. D., University of Pennsylvania, 1930  
Vouchers: Wm. J. Lentz and G. A. Dick.
- SHERER, KENNETH B. R. R. No. 1, Helena, Ohio  
D. V. M., Ohio State University, 1930  
Vouchers: W. F. Guard and Walter R. Krill.



- SIMPKINS, EARL JAMES 26 Fell St., San Francisco, Calif.  
D. V. M., Washington State College, 1930  
Vouchers: Joseph M. Arburua and John McInnes.
- SMALLBONE, GEORGE M. 46 Quincy Ave., Long Beach, Calif.  
D. V. M., Chicago Veterinary College, 1912  
Vouchers: A. C. Rosenberger and R. E. Duckworth.
- STEVENS, W. VANCE Box 183, Mount Vernon, Ohio  
D. V. M., Ohio State University, 1930  
Vouchers: W. F. Guard and Walter R. Krill.
- WIGHT, CHAS. HENRY 2709 Moss Ave., Los Angeles, Calif.  
D. V. M., Kansas City Veterinary College, 1916  
Vouchers: A. C. Rosenberger and R. E. Duckworth.
- WILSON, RALPH A. Waldo, Ohio  
D. V. M., Ohio State University, 1930  
Vouchers: W. F. Guard and Walter R. Krill.

### Applications Pending

#### SECOND LISTING

- Bolstad, Salmar Paul, 680 12th Ave., Milwaukee, Wis.  
Criley, Ben R., Box 477, Pearl River, N. Y.  
Davis, William L., 821 West 23rd St., Pine Bluff, Ark.  
Digman, Robert John, 519 Wentworth Ave., Milwaukee, Wis.  
Dixon, Capt. Oness H., Jr., Iowa State College, Ames, Iowa.  
Fishback, Howard B., 410 Grove St., Fort Atkinson, Wis.  
Gegax, Charles Leroy, 1888 Kinnickinnic Ave., Milwaukee, Wis.  
Getz, Robert L., Harrisonburg, Va.  
Hobbs, Harry H., 308 Federal Bldg., Milwaukee, Wis.  
Hyde, Walter W., Wellington, Ohio.  
Janke, George Charles, 271 Washington St., Wauwatosa, Wis.  
Kernohan, George, 518 Keokuk St., Petaluma, Calif.  
Knoernschild, Herbert W., 332 Federal Bldg., Lincoln, Nebr.  
Moeller, Joseph R., R. 8, Mt. Washington, Ohio.  
Myers, John L., 142 12th Ave. N., South St. Paul, Minn.  
Neff, Samuel C., Staunton, Va.  
Richardson, John Goddard, 1338 Broad St., Providence, R. I.  
Smith, William C., 1273 40th St., Milwaukee, Wis.  
Swalberg, Ralph Clement, Box 214, Spanish Fork, Utah.  
Townsend, Jay Griffith, 6701 Malabar St., Huntington Park, Calif.  
Varnum, Samuel Chandler, 724 Plankinton Ave., Cudahy, Wis.  
Verduin, Francis J., 430 Van Norman Ave., Cudahy, Wis.  
Walters, Ezra Joseph, 200 Maple St., Wyandotte, Mich.

The amount which should accompany an application filed this month is \$7.50, which covers membership fee and dues to January 1, 1931, including subscription to the JOURNAL.

### COMING VETERINARY MEETINGS

- Alabama Veterinary Medical Association. Montgomery, Ala.  
July 1, 1930. Dr. C. A. Cary, Secretary, Auburn, Ala.
- Ontario Veterinary College Conference for Practitioners. Ontario  
Veterinary College, Guelph, Ontario, July 7-11, 1930. Dr. C.  
D. McGilvray, Principal, Guelph, Ont.
- Wisconsin Veterinary Medical Association. Hotel Wausau,  
Wausau, Wis., July 7-8, 1930. Dr. B. A. Beach, Secretary,  
University of Wisconsin, Madison, Wis.

- Illinois State Veterinary Medical Association. Bloomington, Ill. July 8-9, 1930. Dr. J. V. Lacroix, Secretary, 1817 Church St., Evanston, Ill.
- Minnesota State Veterinary Medical Association. University Farm, St. Paul, Minn. July 8-9, 1930. Dr. C. P. Fitch, Secretary, University Farm, St. Paul, Minn.
- Maine Veterinary Medical Association. Bangor, Me. July 9, 1930. Dr. L. E. Maddocks, Secretary, R. F. D. 2, Augusta, Me.
- Kentucky Veterinary Medical Association. Brown Hotel, Louisville, Ky. July 9-10, 1930. Dr. C. G. Kreidler, Secretary, Maysville, Ky.
- New Jersey Veterinary Medical Association of. Asbury Park, N. J. July 10-11, 1930. Dr. E. R. Cushing, Secretary, 947 Prospect Ave., Plainfield, N. J.
- Virginia State Veterinary Medical Association. Staunton, Va. July 10-11, 1930. Dr. Geo. C. Faville, Secretary, Hampton Institute, Hampton, Va.
- North Dakota Veterinary Medical Association. Fargo, N. Dak. July 10-11, 1930. Dr. Lee M. Roderick, Secretary, State College Station, Fargo, N. Dak.
- Northwest Veterinary Medical Association. Chehalis, Wash. July 14-16, 1930. Dr. Clifford Ackley, Secretary, Winlock, Wash.
- Ontario Veterinary College Conference on Fox Industry. Ontario Veterinary College, Guelph, Ontario, July 14-16, 1930. Dr. C. D. McGilvray, Principal, Guelph, Ont.
- Nevada State Veterinary Association. Reno, Nevada. July 16, 1930. Dr. Edward Records, Secretary, University of Nevada, Reno, Nevada.
- Missouri Veterinary Medical Association. Hannibal, Mo. July 22-24, 1930. Dr. J. D. Ray, Secretary, 400 New Centre Bldg. Kansas City, Mo.
- Maryland State Veterinary Medical Association. College Park, Md. July 24-25, 1930. Dr. E. M. Pickens, Secretary, College Park, Md.
- Montana Veterinary Medical Association. Great Falls, Mont. July 25-26, 1930. Dr. Hadleigh Marsh, Secretary, Agri. Exp. Sta., Bozeman, Mont.
- Hudson Valley Veterinary Medical Society. West Point, N. Y. August 13, 1930. Dr. J. G. Wills, 122 State St., Albany, N. Y.
- American Veterinary Medical Association. Ambassador Hotel, Los Angeles, Calif. August 26-29, 1930. Dr. H. Preston Hoskins, Secretary, 537 Book Bldg., Detroit, Mich.

## ROUTINE MICROSCOPIC FECAL EXAMINATIONS IN SMALL-ANIMAL PRACTICE\*

*By E. R. STEEL, Kansas City, Mo.*

At the 1928 meeting of the American Veterinary Medical Association, Dr. E. A. Benbrook<sup>1</sup> presented a very comprehensive illustrated paper on microscopic fecal examinations. However, there was no opportunity for discussion of his paper, so that this paper will serve not so much as a duplication of the subject but rather as a discussion of the application in small-animal practice of the methods which he outlined, covering a period of two years, for I have done this work since Dr. H. E. Biester, who is associated with Dr. Benbrook, demonstrated the technic before the Missouri Valley Veterinary Association clinic, in 1927.

In general practice, in the diagnosis of parasitism in hogs, sheep, poultry and sometimes cattle and horses, opportunity for a post-mortem gives the veterinarian a means of finding out the kind of infestation; but in small-animal practice, usually no such opportunity is afforded, for we cannot kill our patient to find out the nature of the ailment, since the treatment of individual animals and not groups of animals is the problem presented. It becomes necessary, therefore, to work out a method of diagnosis for parasitism which is accurate, rapid and practicable. Microscopic examination of the feces is accurate, may be fairly rapid and is practicable, if the proper method is followed.

Of the three methods in use—the smear, the flotation-only, and the flotation-centrifuge methods—I prefer the latter, because it meets the requirements I have outlined for small-animal practice. When I first started this work, I secured a hand centrifuge in order to check the method outlined by Dr. Biester, but later I installed an electric centrifuge. I had used the smear method but was not satisfied with it because there was always the element of doubt and several smears had to be made as checks. After checking this method against the flotation-centrifuge method, I soon discarded it almost entirely.

It seems to me that it weakens my position with my client if I make a smear from a glass rod or thermometer sample and upon finding it negative have to tell him this is not final. I have had it fail so often I simply quit that practice. To make a smear, as

\*Presented at the sixty-sixth annual meeting of the American Veterinary Medical Association, Detroit, Mich., August 13-16, 1929.

small an amount of feces as is possible to obtain is spread as thinly as possible on a slide. Some veterinarians add a few drops of a ten per cent sodium hydroxid solution to clear up the fecal matter and make the eggs more visible. With the flotation method, a comparatively large amount of feces is used (approximately one gram) and the eggs come to the surface after the sample is dissolved in a sugar, salt, glycerin or water-glass solution.

It is evident that the chances of finding eggs in a large sample are much better than with the smallest amount capable of being spread on a slide. The flotation-alone method, however, has the disadvantage that it requires from a half-hour to several hours to complete the test. With the flotation-centrifuge method, the whole process is completed in a few minutes. Many of our clients wait for the sample to be run and we have been educating them to bring samples both for the first test and later tests. We allow them to see the whole process and to examine the eggs through the microscope themselves. Following this plan, we sell very little "worm medicine" and we are thus keeping this work in our hands by scientific methods rather than commercializing the profession by selling remedies.

#### MICROSCOPIC EXAMINATIONS ESSENTIAL FOR GOOD WORK

I have been surprised, upon visiting many small-animal hospitals, some of which have been conducted as such for years, to find that no microscopic examinations of feces are run whatever, but that the practice of "worming" dogs is based on clinical symptoms or is just guess work. To me there is little satisfaction in either plan, for I have been badly fooled by both. I have had many cases in dogs and cats in which the symptoms were those of hookworm infestation very clearly defined, but on microscopic examination of the stools I found I had a case of coccidiosis or, by eliminating both parasites and coccidia by the test, concluded I had a case of chronic intestinal catarrh sometimes brought about by repeated doses of castor oil or through the action of slow poisons, which cats and dogs sometimes get from eating rat-poisoned animals or the poison itself.

In the differential diagnosis of distemper in the early stages, also, microscopic fecal examinations help us very much. The symptoms of hookworm or whipworm infestation often resemble distemper very closely. The temperature test alone will not determine the case, for in toxic conditions associated with parasitism the temperature will rise as well. In these cases we

check the animal for parasitism, correct the digestive disturbance and send the animal home as soon as he will eat, with the advice that the condition may turn out to be distemper no matter how many parasites we have been able to remove. Many of these cases prove to be distemper and others do not. If the fecal examination is negative, we have a much better guide in our diagnosis. In running routine fecal examinations, on the other hand, we find cases of hookworm and whipworm infestation in which the animals show no symptoms.

#### A CHECK ON TREATMENT

Another feature of running routine fecal examinations is that we can thus check our treatments. The eggs of parasites will disappear from the stools usually within a week and in many cases when a purge has been administered after treatment or an enema given before treatment they will disappear in a few days, if the treatment has been 100 per cent efficient. Many of our cases will run negative upon the first check test in hookworm, ascarid and even whipworm infestations. The only limitation I have found in microscopic fecal examinations is that ascarids may be present which are too young to be laying eggs; so we always inquire if the animal has been "wormed" within the past few weeks. Of course, in hookworm infestation we must take into consideration that the larvae may be burrowing through the tissues and a positive test after a few weeks may not mean that the treatment has been inefficient. Two treatments may be needed. In dogs recently purchased from kennels, this is especially true, but with house pets which have had no opportunity for re-infestation for some time, we find most of the animals treated are negative upon a check test in three weeks after treatment. Hutyra and Marek<sup>2</sup> state that hookworms may be found upon microscopic examination to be laying eggs in the feces in twelve to eighteen days after experimental infestation through the skin.

One of the features of worming dogs which we have learned by fecal examinations is that the preparation of the animal is as important as the drug used. Dr. S. W. Haigler,<sup>3</sup> at the 1928 A. V. M. A. meeting, brought out his plan of giving salts previous to treatment for hookworm infestation. I prefer to give an enema twelve hours after the animal has been starved and then in twelve hours give the treatment with no purge following, for I have found Epsom salt irregular in its action in dogs and I believe also that any drug which may be at all irritating previous to treatment will

have a tendency to induce vomiting when the vermifuge is administered. Besides, by giving enemas we get away from the toxic action of tetrachlorethylene and carbon tetrachlorid, which so often occurs if the dog is constipated and the drug is hindered in its movement through the bowel, causing absorption, manifested by staggering gait, convulsions and later liver complications.

To clean out the bowel we even use gastro-intestinal lavage in some cases and in whipworm cases we commonly do this, for we want to give carbon tetrachlorid in large doses, one cc per kilogram body weight, as recommended by Hall.<sup>4</sup> We have no toxic effects from this dosage in this way. By checking our treatment in one week, by microscopic fecal examination, we determine the efficiency of the treatment and if whipworm eggs still persist we put the animal on santonin in 1- to 2-grain doses daily for a week, followed by castor oil. In a few days we check the treatment again by microscopic fecal examination. In a few instances we have had to repeat the carbon tetrachlorid and santonin treatment, but so far we have not had to operate to remove whipworms, as determined by subsequent microscopic fecal examinations and by postmortem study in a few instances in stray dogs.

#### PURGATIVE NOT NEEDED

There are some cases, of course, in which enemas are not needed, such as in cases of diarrhea and in pups which have normally loose stools. Tetrachlorethylene and carbon tetrachlorid, especially in large doses, are laxative. After an enema or when the bowels are open otherwise, dogs do not need purgatives following the administration of these drugs. We feed raw liver, raw hearts or raw lean beef following treatment with these drugs and if we wish to check for tapeworms also, we give the arecolin after a few feeds. A common practice with some veterinarians is to give vermifuges for hookworms, whipworms or ascarids after a starvation period, and after a few hours give arecolin to sweep out the tapeworms as well. This practice I have found efficient only in cases of ascarid infestation associated with tapeworm infestation, as determined by subsequent microscopic fecal examinations. For hookworm and whipworm treatment, we want the bowel empty and the drug to pass through slowly, whereas, for tapeworm treatment, we want the animal fed up and a starvation period no longer than over night. We have less trouble, too, from vomiting, if the animal is given a few feeds



after receiving tetrachlorethylene or carbon tetrachlorid for other parasites before the arecolin is administered. To make a complete check for parasitism, then, requires at least three days, including the starvation period.

In the diagnosis of tapeworm infestation, unfortunately we can not find the eggs unless a segment is broken in passage and in these cases the eggs will float and centrifuge out the same as the other eggs. We must either watch the stools for segments passed, which is the proper method, if possible, or give the animal the treatment which is fairly diagnostic if a good arecolin action is secured. Gastro-intestinal lavage also is fairly diagnostic, for we usually wash out some of the tapeworms, although I have washed out dogs thoroughly with negative findings and later got tapeworms by treatment. This is true of ascarids also, for we usually wash out some or all of them, but I have had cases in which microscopic examination showed ascarid eggs after failure to wash out any worms, and treatment caused their expulsion. We seldom wash out hookworms or whipworms, so that the microscopic test is the only reliable method of diagnosis.

#### A CHECK ON SANITATION

Another use of routine fecal examinations in small-animal practice is to check up the sanitation in regard to the destruction of worm eggs in the hospital. We have found that we can rid animals of hookworms, whipworms and ascarids and keep them indefinitely negative to tests, by thoroughly scrubbing the cages with washing powder and scalding them out with hot water. We have a hot-water hose attachment in every room and for our cemented yards.

By our routine fecal examinations we have been able also to pick out cases of coccidiosis, using the same technic as for worm eggs as outlined by Benbrook.<sup>2</sup> Hutyra and Marek<sup>6</sup> state that coccidia in dogs and cats apparently do not produce any morbid symptoms. In old animals in general I can confirm this observation but in young animals symptoms do appear which resemble very closely both hookworm infestation and distemper. In the fatal cases, however, I have not been able to place the cause of death, for they were apparently complicated with cat or dog distemper. A case in the hospital at the present time shows an intermittent diarrhea, no fever, appetite good but conjunctivae very red and occasionally blood in the stools, which are generally

black, probably due to the fact that coccidia in other animals than calves are found in the small intestines.

In this connection, I find it advantageous to run fecal examinations of all boarders to protect ourselves from incrimination, for the above cited case of coccidiosis was in a boarder. By locating such cases we are able to control infestations of other animals better, for we have found coccidiosis highly contagious, especially in pups which are inclined to lick water at every opportunity. We treat all cases of parasitism if the animal is to remain at the hospital very long, although we try to induce the owners to let us check the animal for parasites, for which an additional charge is made. We find this very profitable.

Finally, fecal examinations are of value in locating mange cases, for we sometimes find either the demodectic or sarcoptic mange mites in the stools, no doubt from dogs biting irritated places on their bodies, although they show no lesions. We have found the demodex, or red mange mite, in this way in a few cases and have noted that later the animal did not have mange spots that were ordinarily visible.

In conclusion, I hope that this discussion, presented in a rather desultory manner, will stimulate interest in routine fecal examinations, for I certainly would not wish to practice without the many advantages this feature affords. To the practitioner, I recommend it as very easy to master and one of the routine practices any veterinarian should carry on without the aid of special laboratory diagnosis from a college or other laboratory.

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#### DISCUSSION

DR. STEEL: Dr. Bower stopped at my place coming up here and I showed him a case of coccidiosis and he asked me to bring a sample up here for the clinic. The stools of this animal, when we made the first examination, were literally full of coccidia and also hookworm eggs. We treated the animal for hookworms and the owner came to get the dog the next day. He took him home and after about a week, I think it was, he called up and wanted the dog destroyed on account of diarrhea. I told him to bring the dog in and we would destroy it, but I kept the dog for observation. I intended to bring a sample here but I found on the fecal examination that the dog was negative both for hookworms and for coccidia.

Now, this is true of coccidiosis: If you can control the source of infestation, you can control the condition in the dog. We did nothing to the dog for coccidia other than put him on a milk diet.

DR. F. F. PARKER: What is your usual treatment for coccidiosis?

DR. STEEL: I have not been giving them any treatment. We know from the study of coccidia that we can eliminate them by controlling the source of infestation. This dog I mentioned had been drinking from one of the neighbor's fish-ponds. Now, I think it was at the 1924 meeting, held at Portland, Dr. W. T. Johnson, working on poultry, told us that he could control coccidiosis in chickens by simply putting them on wire cloth so they could not re-infest themselves through their food or drinking water; so we have not been doing anything other than controlling the source of infestation and following out the recommendation of Beach, of California, that a milk diet is indicated in coccidiosis, although I think coccidia will eliminate themselves. We have found from fecal examinations of old dogs that coccidia do not produce morbid conditions. In young dogs and cats they do, but I say, in cases where they cause death they are cases associated with dog distemper or cat distemper.

DR. C. A. PLEUGER: Have you found any cases of eczema after worming a dog?

DR. STEEL: We never treat any skin disease in a dog, including mange, without checking the animal for parasitism. I personally think eczema is associated with some devitalizing factor.

I had a human skin specialist in Kansas City who brought a dog in and we isolated the red mange mite from the scraping. I told him that we would check the animal for parasitism and then treat the skin and put him on calcium lactate for a few weeks to reduce the irritation of the skin. We have been doing that right along.

Talking to Dr. Harkins, of the Research Institute of Cutaneous Diseases in Philadelphia, I asked him last winter what he was doing for red mange and he said he wasn't doing anything in particular, and I told him what we were doing with chloroform to destroy the parasites and treat the dog internally, and he said that if we would increase the dose of calcium lactate to eighty grains daily that we could reduce the irritation of the skin by increasing the calcium in the skin to a point where we could apply croton oil or turpentine without blistering; so we have increased the dose of calcium lactate in those conditions. But this human skin specialist stated that the demodex mites found in the human were not pathogenic but that they might become active on the scalp of the human under certain devitalizing conditions, such as tuberculosis or parasitism.

SECRETARY MILKS: I have been making the fecal examinations for a long time and I have been working on the parasites for a long time and I do a good deal of smear work. I started that way and I find that in the country dogs the smear shows up a great many things that you can see right off; for instance, you have a dog brought in and the owner does not want to wait until you wash him out, but we frequently can get enough off on our thermometer for a smear and in a good many cases we can diagnose the parasite. I do not mean that we do not use the centrifuge. We do. It is a question in my mind if we need the last egg to tell whether the parasites are causing trouble or not.

I think perhaps in the larger cities you can keep your dog free from parasites, but in cities of the size of Ithaca, where everybody turns his dog loose, I do not believe that you can keep them free of the parasites and even if he carries a few it is about as well as you can do because I know from experience that you can free a dog of hookworms and the owner turns him loose and he goes and fills up again. So we keep them healthy and we figure they are in pretty fair shape. It would be like it was with the Lockbiler treatment of hookworms in South America. When they had gone down there they cleaned up the people and if they hadn't cleaned up the sanitary conditions a little they would go right back and get more.

There is something that has not been mentioned this morning in regard to hookworms, and that is that in some of your worse cases of hookworm you will find very few eggs present. I do not understand it except that the animal is so devitalized that the hookworms leave, and often on autopsy we find a few hookworms and lots of evidence where there have been a great many hookworms. I don't know why that is. There is an old saying that lice leave a body when a man dies and it looks like the hookworms are getting out ahead of time. I don't know whether that is so or not, but I have noticed that in some cases where an animal was down and out, with a typical hookworm stool, we had to

centrifuge sometimes two or three times, using a lot of material, to find any worm eggs. The ascarids present a different condition. I don't think you will have to worry about ascarids in a grown-up dog. They may trouble a few, but the big trouble with ascarids in dogs is in puppy diseases. You get rid of a great amount of the ascarids and they won't bother later. They may have some of them.

We, as I said, do a good deal of smearing and a good deal of centrifuging. If I have a sample sent in, I always centrifuge it and unless we can find it promptly on a smear we centrifuge it.

I know Dr. Steel doesn't want to make you think that the microscope takes the place absolutely of common sense in your diagnoses. You, of course, will find worm eggs sometimes when the worms are not the cause of your trouble and it takes a little discrimination to figure it out; that is, a dog might come in and you get suspicious of most anything; it does not mean the dog doesn't have distemper, it simply means you have a devil of a job on your hands.

In regard to calcium lactate, it has been found by men working on dogs that calcium lactate or calcium in some form, makes your dog much more tolerant to carbon tetrachlorid. There was one man who had charge of several dogs that they had been using as test animals to see how much carbon tetrachlorid they could stand. They were put over in charge of another man and then they tried it after a while and they found that the dogs could stand hardly any. In checking up, the first thing they found was that the second man had been feeding no bone, no calcium feeding at all, and when they put them back on calcium they found they were just as resistant as ever. That, I thought, was a fair point and may explain some things and may be some reason why dogs with rickets do not take so well to this treatment as dogs that do not have it.

We had an interesting case in the clinic last winter. We could not find a thing with the microscope and I did not dose this dog very heavily. He had bad diarrhea off and on. Today he would be bad and tomorrow he would not be. But while we could not find any ameba present I know that later this dog recovered after the hypodermic treatment for ameba with Vellie's. I am just passing this out. I would not use this stuff because it might make me look like a monkey, but certainly if I find another case that is persistent I am going to try this out, or some ipecac preparation.

DR. STEEL: In regard to checking dogs for worms, we find that in house pets, where they have recovered from their original infestation and are fed from clean pans, they will stay indefinitely rid of parasites because they have no chance for re-infestation.

In regard to country dogs, I have one kennel of hounds, 53 hounds from a hunt club to take care of, and these pups are all kept on the ground floor. They get in horrible shape and even though we worm them once a month or every six weeks they get run down to skin and bones from diarrhea. I tried to get the people to put in cement floors to control parasites, but they haven't done it, so we find it necessary, in case of hookworm infestation in the pups, to re-check or retreat those dogs at least once a month. We have also found we could raise police pups successfully and take them through distemper better if they let us run a microscopic examination of the stool at least every six weeks; we try to get a sample once a month and keep the animals free of parasites. In addition to this we feed them cod-liver oil.

In regard to carbon tetrachlorid, I did some experimental work with that, giving fairly large doses or comparatively small doses. I found the dog if emaciated would get down and go into convulsions a good deal as with strychnin poisoning, especially if constipated and the drug was absorbed. We have given ounce capsules or 18 cc of carbon tetrachlorid to dogs the size of Collies, police dogs, Dobermans, etc., after they have been given enemas and we have no toxic condition then. I would not advise that, however, in dogs very much debilitated. I would rather give it in small doses and build them up with cod-liver oil and calcium lactate. Last week I gave an ounce and a half of carbon tetrachlorid to a Great Dane without any bad effects.

DR. A. D. GOLDHAFT: In persistent diarrhea in puppies we have found in a good many cases that it is caused by coccidia, but a different form of coccidia than we are usually accustomed to seeing under the microscope. In poultry

we are having a lot of trouble. We have range paralysis. It is now named duodenal coccidiosis; it is usually found in the small intestines and the coccidia are much smaller than the coccidia found in the large intestines, and it is very hard to determine under a high-power lens, and we found in a good many cases persistent diarrhea is caused by coccidia. I wonder lots of times whether there is any connection between the coccidia found in calves and cows and those in dogs, whether there is any connection between these forms of coccidiosis and whether milk really has a curative effect on coccidiosis.

DR. STEEL: In regard to the size of coccidia, in the bulletin that Dr. Benbrook of Ames, Iowa, published (I make reference to it here. I advise everybody to get a copy. It has been reprinted but has gone out of print again and I understand from Dr. Benbrook that he is going to print some more and make a charge of fifty cents for this bulletin), the coccidia described were very small and the coccidia I found were very much larger than those and at first I did not learn to identify them; so I got a sample from a wild fox with coccidiosis and sent it to Dr. Benbrook. I identified them and told him they were very much larger than he had pictured in his bulletin. I also found that true even in cats and dogs; so in the next bulletin he got out, that was published in April this year, he shows the coccidia in the pig which resemble those I find in dogs and cats. There may be a difference in the types of coccidia in different territories but in my locality they are much larger than pictured for dogs and cats.

### Texas Has a Tuberculosis-Free County

Texas has entered the list of states having "modified accredited areas," areas that are practically free from bovine tuberculosis. On May 1, 1930, Dallas County was officially recognized as being in that status. Eradication work was under state and federal authority with the county officials and cooperating live stock owners. The application of the tuberculin test to 43,283 cattle in the county revealed only 114 reactors. This degree of infection was materially less than the permissible 0.5 per cent of the total cattle population, which entitles a county to accreditation.

The preliminary work of testing individual herds in Dallas County in recent years was largely responsible for the slight degree of infection revealed in the recent test, according to Dr. A. E. Wight, in charge of tuberculosis eradication for the U. S. Department of Agriculture.



Harbor at Avalon, Catalina Island. Los Angeles County, California



## LEGAL ASPECTS OF TUBERCULOSIS ERADICATION\*

*By A. E. WIGHT, Chief, Tuberculosis Eradication Division,  
U. S. Bureau of Animal Industry, Washington, D. C.*

I am pleased to comply with the request of the Committee on Program for a discussion of the subject assigned, but my remarks will be rather general, including some observations that I have made in connection with the legal side of cooperative tuberculosis eradication work since its inception in 1917.

A lawful basis for this work is absolutely necessary, from both a federal and state standpoint. The federal requirements are comparatively simple, having but two essential provisions: first, the establishment of the work on a cooperative basis, and, second, the payment of the federal share of compensation to the owners of tuberculous cattle. Of course, appropriations are needed, and it is also necessary to utilize part of the federal statutes governing the interstate control of infectious diseases among live stock.

### FEDERAL INDEMNITY INCREASED

The first federal law which substantially provided for cooperative tuberculosis eradication work and for the payment of federal indemnity for tuberculous cattle became effective October 1, 1918, and there have been no fundamental changes in this original law since. One of the noteworthy changes made recently was an increase in the maximum federal share of indemnity from \$25 to \$35 for grade and from \$50 to \$70 for purebred cattle.

### STATE LEGISLATION

State legislation affecting this work is, naturally, of much greater magnitude and more complicated, for it is necessary to enact such laws in the various states as will be consistent with their constitutions and in keeping with the general plan for the handling of live stock sanitary matters. Much state legislation of this kind has been enacted in recent years to provide for the various phases of tuberculosis eradication work among live stock, and more laws will be necessary from time to time. There are many interesting features in connection with tuberculosis eradication in the various states. Some remarkably simple laws have proved to be effective and practical, and have been powerful enough to bring about the desired results. It is interesting to

\*Presented at the sixty-sixth annual meeting of the American Veterinary Medical Association, Detroit, Mich., August 13-16, 1929.



observe the functioning of these laws, and it is especially pleasing to note the success attained by their use, and the satisfaction that prevails among state and local officials responsible for administering the work.

I will not attempt to discuss here the many important features of state laws, but before dismissing the subject I wish to recommend legislation that will provide for the clean-up of tuberculosis in the various counties under the area plan and to urge that preparations be made for retesting cattle in modified accredited areas in order that such areas may remain in that status. This latter feature is especially important and should be given careful thought by those in charge of the work, between now and the meeting of the next legislature.

Although laws are essential in eradicating a contagious disease among live stock—especially one that affects human beings as does bovine tuberculosis—such laws should be conservatively framed and administered, and accompanied by a sound educational program. One of the clearest and most comprehensive statements in this connection can be found in a general statement made by the International Commission on Bovine Tuberculosis, of the American Veterinary Medical Association at San Francisco, California, in September, 1910. The statement, made subsequently to remarks on educational publicity, follows:

It must not be forgotten, however, that in this, as in any other educative process, a measure of disciplinary control is essential to success. Needless to say, such control can be secured only by the passage of legislation which, while clear and comprehensive, must at the same time be sufficiently conservative to avoid exciting alarm or arousing antagonism on the part of the owner, especially of valuable herds. The best law ever framed can be made an utter failure by stupid or injurious administration, while, on the other hand, the most drastic legislation can be rendered acceptable if enforced with reasonable tact and diplomacy.

#### MUNICIPAL MILK ORDINANCES

Under the heading of "Legal Aspects of Tuberculosis Eradication" may be included the promulgation and enforcement of municipal ordinances providing for milk from healthy cows. These ordinances, of which there are now a great number in effect in the United States, have had a very important place in the development and advancement of tuberculosis eradication work among cattle. Such ordinances will continue to be a most effective means of keeping up the regular tuberculin-testing of dairy herds used to supply milk to cities and towns in which they are in force; thus avoiding the possible spread of infection. The cooperation of the forces of the various health departments, work-

ing under city ordinances provided for by law, has resulted in much benefit to the campaign as a whole. Striking examples of this are found in the Chicago, Cleveland and Detroit territories, as well as in many others.

#### COUNTY COOPERATION

A provision for county cooperation is made by the state law, and it is considered of much importance and aid to the campaign. Although it is not absolutely necessary, however, in any branch of live stock sanitary work, the operation of which requires great length of time, county and other local cooperation are considered to be essential and beneficial. Many different varieties of county cooperation are in effect in the United States, all of which are good, though some have points which make them better than others. When there is substantial county cooperation, usually a greater interest is shown by the local people in the proper enforcement of the necessary regulations.

#### TESTS OF THE LAW

In reviewing what has happened in the last few years, in the enforcement of state laws for the eradication of bovine tuberculosis, one is impressed with the fact that so few test cases have been necessary; and further, that in nearly all these cases the decisions rendered have been favorable to the state. The campaign had been in operation on a large scale but a comparatively short time in some of the states before it became necessary to try out the law. Some very striking cases are on record, but I shall mention only a few at this time. However, in mentioning these I am not unmindful of other decisions, which have been and still are of great importance.

The famous case in the state of Minnesota, which finally reached the Supreme Court of the United States, is outlined in papers of my distinguished friend, Dr. C. E. Cotton, and can be found in the records of the U. S. Live Stock Sanitary Association for the years 1925 and 1927. Records of some of the cases which I will cover in this article can be found there, together with citations, which will be very helpful in future years.

This Minnesota case, which was ultimately carried to Washington, was dismissed by the U. S. Supreme Court for want of substantiation, and the authority for this action was based on precedence of three important rulings of that court in previous years.

In Michigan, where we are privileged to come together at this meeting, tuberculosis eradication has made remarkable progress, and but a limited number of legal tests have appeared in connection with it. One case, however, which was the most important one, attracted sufficient attention to make it appear that great difficulty and hardship were being caused the farmers of this state. This case was decided in favor of the State by Judge Jacob N. Sampson, who dissolved the injunction after an exhaustive study of the facts.

The Middle West has not been alone in having legal matters to contend with in the control and eradication of tuberculosis among live stock, for in Pennsylvania it was necessary for the superior tribunal in that state to sustain the local courts in refusing new trials to twelve farmers who were convicted of resisting officers and obstructing legal process in connection with the testing of cattle about two years ago.

In New York one farmer decided that it was necessary for him to test the law. This case reached the highest court in the State and was decided against the owner of the cattle involved.

The above-mentioned cases, as well as all the others, are matters of record, and these records will be of great value to those who have this and similar work to administer in the years to come.

In conclusion I wish to express my appreciation for the help that has been rendered by my co-workers and by others who have pointed out the important features of this branch of the campaign. I also wish to be recorded as one who has great admiration for the legal authorities who, after careful and thorough examination of the facts, have rendered decisions that make it possible to proceed in an effective manner to combat tuberculosis among cattle. Finally, I again wish to recommend careful consideration and study of necessary legislation that will keep this important work in a proper status so that there will be no opportunity for tuberculosis to develop and spread among our live stock.

#### DISCUSSION

DR. J. A. BARGER: Mr. Chairman, I am sure it would interest all of us to hear something from Dr. C. E. Cotton.

DR. C. E. COTTON: Mr. Chairman, I did not come prepared to make any talk relative to this aspect of control work. I regret that I am not better prepared.

I, perhaps, could give a short summary of the celebrated Meeker County case in Minnesota that has already been covered in two papers presented to the United States Live Stock Sanitary Association.

This case started in the first county in which we undertook to control tuberculosis in Minnesota. We had made the first complete test of all the cattle i

the county and met with considerable opposition when we started to make the first retest of infected herds. The percentage of infected herds was high. There was some politics involved and a few shrewd lawyers succeeded in having an injunction served by 142 farmers.

The lawyers who instigated the injunction, with the assistance of the editor of one of the local papers, were successful in framing the wording of the injunction, so that it applied all over the State, not only on these 142 farmers, but we were enjoined from proceeding with the work anywhere in the State.

We succeeded in having a change of venue to Ramsey County, which is the county in which the Capitol is located, and we went into the chambers of the District Judge and told him the conditions—before we had a hearing, in fact. He told me to proceed with my work in other parts of the State.

We had the very large majority of the cattle-owners in the county who were in favor of the work sign an intervening proposition to the court explaining that we could not succeed in accrediting this county, if we were prevented from proceeding with the work. This had a good psychological effect on the comparatively few men who had signed the injunction. The number sustaining the work far exceeded the number who were in the enjoining procedure.

The decision of the District Court was in our favor, but it could not be appealed to the United States Court because of the fact that it was an injunction proceeding. So the attorneys succeeded in getting another fifteen hundred dollars subscribed and we tried it over, in the District Court, on the validity of the law.

New evidence was introduced relative to one of our regulations that would not permit an owner, who refused to let us test, to market his milk or milk products at a creamery within the county, whereas, a man who lived over the line, in an untested area, could bring his products to this county creamery with impunity. They argued that this was class legislation.

In order to refute this, the Attorney General stated that this was a new work and that the law required our Board to adopt the necessary rules and regulations to carry out this law and, without doubt, this would be taken care of by the Board.

He forced us to adopt regulations whereby no creamery located in these areas in which the work was initiated could handle milk or milk products from herds of cattle that had not passed satisfactory tests.

The decision in this second case was also in our favor and the opposing attorneys appealed to the United States Supreme Court on the question of taking a man's rights away, under the 14th Article of the Constitution. The Supreme Court of the United States ruled that the case was not of their jurisdiction, by declaring that this was not a federal question, that it was a police and a health measure, and was a state or local question.

We are of the opinion that our success in our court cases—and I think it applies all over the United States—lies in the fact that this is a question of human health.

I think that Doctor Malcolm and Doctor Barger are in better position to report on the celebrated Iowa case, which is, certainly, a discouraging one.

I understand that the decision went against us, and the opposition, the propagandists, who are using every measure they can to interfere with the success of this control of tuberculosis throughout the country, have ordered two thousand copies of the Judge's decision. You will probably all read it in the next two or three months and learn of the efforts that are being made throughout the central part of the country to embarrass us in this undertaking.

DR. J. A. BARGER: Mr. Chairman, fortunately, the restraining measures that are being instituted do not apply to the funds that are to be used to eradicate the disease, but only to the individual who seeks immunity from the testing of his herd.

Doctor Cotton has referred to a certain number of herds in a county where some owners sought to prevent the test from being applied. This is the situation in Iowa, which, in some ways, is very amusing. We were restrained from the testing of several hundred herds there but as the testing proceeded among the herds that were not enjoined, the finger of scorn was pointed at the herds over which there was an injunction, and so they fell in line, one after another, until all of the herds where the injunction applied were submitted to



the test by request of the owners; and in that particular county now, all of the herds have been retested, as contemplated by the law and by the regulations, to accredit the county.

After that had been done, the court rendered this decision which will be taken to the Supreme Court. That part of it is funny indeed. It did not mean a thing in the world, because all of the cattle had been tested in that county.

Back of the whole thing is this: It is not because we wanted to test cattle or that some of the owners wanted tested cattle, but, finally the public is very discerning and it decides what sort of product it wants.

So, in the work of tuberculosis eradication, we have back of the whole thing the great public urge; urge for pure food; urge for wholesome food; the urge to eliminate waste of hogs and cattle that are continually going to the market as diseased. It is the great urge, as I see it, that sets aside these injunctions, and finally, as we go on and on and on, I do not believe that these court proceedings are going to be effective in restraining the testing of cattle; I believe that the public urge will dominate the situation. (Applause)

DR. WIGHT: I would be glad if we could hear a little about the Michigan case from Dr. Rich.

DR. T. S. RICH: Mr. Chairman, I am not prepared to say very much about the Michigan case. The only cases we have had here have been of an individual nature, the owner simply getting an injunction preventing us from testing his individual herd of herds.

We have had one case of that kind in Michigan which was of considerable interest because the owner of this herd was a man who had been connected with public duties in the past, but always had opposed progress along all lines. We were not at all surprised when he was able to procure an injunction preventing our proceeding with the work until after we had had the matter in court.

I do not believe a recital of the case would be of particular interest, further than to say that the court stood with us. It was a matter of human health, and the court ordered the injunction dissolved and the herd was tested.

It did interfere with our work in Lenawee County to a considerable extent. There were quite a good many owners of herds in that county who, after having reactors found in their herds, refused to sign an agreement and, therefore, we refused to consider federal indemnity for their reactors.

They did this by advice of this owner, who was something of a lawyer himself—at least he professes to be a lawyer—and for quite a while there were a number of claims held up on that account. But those agreements came drifting in from time to time until I think they were all signed but one.

The matter was cleared up and the herds of the county have been tested and retested, and they are in line for accreditation, right away.

DR. L. M. HURT: I have been interested very much in this discussion of the legal aspects of tuberculosis control work and I am wondering if the meeting would be interested in work in a community where there are no legal requirements?

CHAIRMAN KELSER: I believe so.

DR. HURT: Los Angeles County has been handicapped in receiving cattle from all parts of the United States, without restriction, for a great many years. The state law did not protect them in any way, and, as a result, there is an accumulation of tuberculosis there that is rather staggering, and the eradication, or even the control, of it has been quite a problem.

Strange to say, the initiative in this matter has come from inside the dairy industry itself. During the past year and a half the creameries, in agreement with the Milk Producers' Association, have established a graded scale for the payment of milk on the butter-fat basis; first, three cents a point and then ten cents a point, which has resulted in the elimination of practically seventy-five to ninety per cent of all the tuberculous milk in the county. They knew that things were going to pop some day if it ever got to the public that they were handling that kind of milk. I am happy to say that the tuberculous milk in the county is less than ten per cent.

I am interested in the injunction problem because I anticipate we will have ordinances bearing upon the use of any tuberculous milk at all, within the next few months and, naturally, this injunction matter will face us. I am anxious

to talk with the men who have had actual experience with the injunctions, before they get away.

DR. PETER MALCOLM: Mr. Chairman, I don't want the impression to go out that the courts of the state of Iowa are not backing our proposition in the eradication of tuberculosis, even if one judge in the state rendered a decision against us.

We have had several cases in Iowa go up to the Supreme Court. The celebrated Black Hawk County case has been carried to the Supreme Court twice and each time the Supreme Court stayed by us.

Now, the case that we had in Iowa, that Dr. Cotton refers to, in which the judge decided against us, is up to the Supreme Court at the present time.

I might say that we do not feel in Iowa that our work is going to be handicapped one iota, because, in the face of the fact that a number of injunctions by individuals were pending in the district courts against us, our State Legislature, last year, made the State a state-wide area. We have thirty counties yet to come through. Each and every one of these counties, under our state law, shall and must make a levy, and are making a levy.

Now, as Doctor Barger has said, there are only a small number of people in each county who have been stimulated by outside interests, or fellows who like to hear themselves talk; like to be leaders of some opposition no matter how small that opposition might be, and yet, in no county in the state of Iowa have they been able to get over 450 men to sign an injunction.

They have enjoined us in Black Hawk County. That is the county with the 450 names.

But, during the work in Black Hawk County they have submitted their cattle to test. Unfortunately for some of the fellows who signed the injunction, they had reactors in their herds. They had enjoined the Department of Agriculture, the Boards of Supervisors, and everyone in connection with it, and yet submitted their cattle to test.

But when they had the reactors and found they were going to lose their indemnity because it could not be paid under the injunction, they went to the county attorney, nine of them, and had him intercede for them with the judge, to have them take their names off of the petition so they could get the indemnity. (Laughter)

Now, that, to me is very encouraging. When you strike a man's pocket-book, that is the easiest place to knock him down. He doesn't have to be a Scotchman; the average man will do that. (Laughter)

So I don't want the impression to go out that the great state of Iowa is not going to be able to accredit the whole state.

I have all the confidence in the world that the Supreme Court of the state of Iowa, in the Mitchell County case, when it comes to it, will decide in our favor, because, if they don't, they have got to retract some of the decisions that they made in the Black Hawk County case.

Unfortunately, for us, in this case they attacked the efficiency of the test. We, in Iowa, think that they did not give our testimony the recognition that they should have, so that we do not feel that the work is going to be handicapped because of the fact that when the Supreme Court in your state backs you up in every injunction that is brought up, it is pretty hard to see how we are going to lose out.

This was the first case that we lost and that was in a district court and, as Dr. Barger has said, the decision of the judge was not handed down. In fact, when the case was on trial, every man who had signed the injunction had had his cattle tested. So we feel that that is the best evidence in the world that the people in the State want it.

And, another peculiar thing about the handing down of this decision: This decision was not handed down until after our Legislature made the State a state-wide area. (Applause)

CHAIRMAN KELSER: Dr. Hays, do you care to discuss this subject?

DR. C. H. HAYS: Well, we haven't anything to say. We took more than one licking, but finally we feel that we came out on top.

DR. COTTON: Mr. Chairman, is there anyone here from Ohio?

DR. H. H. SPARHAWK: I am from Ohio but I am not in touch with the situation and, really, not interested in it directly.



During the past two years, we have had considerable excitement in the tuberculosis eradication work in Summit County. The sum and substance of the whole proposition, as far as I can see it, as an outsider, is that we have quite a powerful newspaper in our community and it has taken the opposition side of this situation and, in order to further its circulation, it has found that it was a pretty fair selling proposition to advance out into the suburban districts and acquire the support of the farmers on a question that the farmers thought was hurting them. They added their support to the paper and put up a fight which caused numerous injunctions and suits. But the courts have dissolved all of these injunctions, so that at the present time we have no serious obstruction relative to tuberculosis eradication work.

The present action of the County Commissioners indicates that politics has stirred up enough enmity so that they have refused an appropriation for the county work for the ensuing year. Cleveland extends its milk-shed into that county and I am quite positive that the producers in Summit County will be properly handled by Cleveland shutting off their milk supply.

The ordinance of Akron, Ohio, was passed about nine or ten months ago, whereby all milk sold in the city of Akron must come from herds having passed the tuberculin test. The city of Akron can not take any action until a year has passed. Then Akron will also shut off all producers who have not complied with the program.

We feel that, as soon as Cleveland and Akron and, possibly Canton, Ohio, shut off the supply from these herds, the County Commissioners will see fit to provide the proper appropriations to meet with the situation. (Applause)

DR. COTTON: The trouble in Minnesota and in other states is being instigated by the American Medical Liberty League and subsidiary organizations, and the gratifying feature is that associated with them are the anti-vivisectionists and all of the religious cults, chiropractors, a few physicians, and everybody who does not believe in modern preventive medicine. They condemn the use of diphtheria antitoxin; they go into the legislative bodies and condemn the compulsory vaccination of school children and, because of the fact that they condemn everything in modern medicine, is a pretty good argument for us to use in support of tuberculosis eradication.

They have a big organization and a large amount of funds behind them. It is like the walking boss of the unions—if they don't keep people excited they will lose their jobs and their salaries.

DR. J. C. FITZGERALD: Mr. Chairman and gentlemen: I feel rather reluctant in making a suggestion, because it seems rather ridiculous to pit three or four little islands, situated in the middle of the Pacific, against the great mass of the United States, but it might be a suggestion.

Of course, with us, the major portion of our labor is "coolie" labor—Japanese and Fillipino—and it necessitates a great deal of welfare work among the children.

One method that has proved very, very satisfactory is on the basis of education against legal measures for the eradication of tuberculosis. We have adopted measures whereby milk is sold in the school for half price and we have a rather competent man with a very good "gift of gab" sent around to talk to the children and preach pure milk to them in all of the schools and preach tuberculosis eradication; so that among the smaller men and the native dairymen we have very, very little opposition. In fact, we really have no opposition.

As far as our laws are concerned, they have to comply, because it would be rather difficult for any man, an extraneous man from the Territory, to bring his milk 2000 miles across the water.

But I think the education of the children in the schools in the rural districts on the basis of lecturing them on tuberculosis eradication, will do infinitely more than the law will, because they all take the message home to their parents.

DR. A. J. DE FOSSETT: We, in Ohio, have had so much experience with the law that we ought to be lawyers, I guess. We have had about fifteen injunction cases, one right after another. About the time we get one hole closed up we get another one opened some place else.

We do have a little experience in Ohio with a certain class of lawyers that seem to be "ambulance chasers." They seem to be looking for injunctions. They hunt them. They help them along; especially in one part of the State.

Our situation in Ohio is essentially this: The sentiment for tuberculosis eradication is good all over the State, but in certain little pockets, in many of our counties, we have little groups that, in some manner, inform themselves quite well and fully on the phase of the subject as they get it from the American Medical Liberty League. And, regardless of the fact that we put out leaflets and have township meetings, show moving pictures, and give them educational matter, they seem to relish this stuff that is sent out from the American Medical Liberty League and it doesn't take many people to get an injunction. We have found in some counties that only three or four men, with the right kind of a lawyer, can get an injunction.

We had several counties tested the second time over, on the area plan, with the exception of about fifty little lots of cattle belonging to farmers who had probably from one to six cows; who banded themselves together and called themselves "The Cat-O'-Nine-Tails Club." They got a lawyer to represent them and got a temporary restraining order. And up to this day, we have not succeeded in getting a hearing in court on that temporary restraining order. It still is "temporary" and two years old.

Yet, as I said before, the sentiment for tuberculosis eradication in Ohio is splendid. We have the support of all the breed organizations, the milk producers, the milk distributors, the Ohio Dairy Products Company—in fact, all farm organizations are back of us. We have only one organization that is fighting us and that is this so-called "Cat-O'-Nine-Tails Club," but they got ashamed of that name so they renamed it and now they are calling it "The Farm Cupboard." I think they are patterning after the Farm Bureau. (Laughter) It is not a bureau, it is a "cupboard," now, and they get information from the American Medical Liberty League.

We are testing forty-five to fifty thousand cattle every month. We are cleaning up counties. We have got 37 counties on the accredited list and four or five others ready to go on. Two are threatening injunctions. There are only a few injunctions either pending or threatening, so we are making progress in spite of the opposition.

DR. W. S. GIMPER: I am impressed with the peaceful methods of warfare that seem to be in vogue in these mid-western states. Those farmers do not seem to have the pugilistic attitude of our Pennsylvania farmers. Our recalcitrants do not fight us with injunctions; they use rifles, shot-guns, pitch-forks, clubs and stones.

Can you visualize the dignified president of the A. V. M. A. standing in a barnyard attempting to read a section of the law to a bunch of one hundred farmers armed with pitch-forks, testing the points to see if they are good and sharp, and others around hollering, "They have got no law; they can not do anything; run them out!"?

Can you visualize those men taking a group of state policemen, fully armed; rolling them around on the ground in the cow dung, and chasing them away? That is the spirit in Pennsylvania; (laughter) the old buck-tail tiger spirit. (Laughter) Those fighters, if you get them on your side, will fight as hard for you as they will fight against you. That is why we took them into camp. If we can not do it by argument, if we cannot persuade them, we go into court. We don't wait for them to take us into court, we take them through, and we have been uniformly successful in proving to them, by touching their "pocket-book" nerve, I might say, that they are in wrong.

Now, in fairness to the State Police, I want to say that on the several occasions when they were chased out, the policemen were there under instructions not to use any physical force to overcome these farmers; it was the psychological effect of their uniforms, and their guns; but it didn't have any effect (laughter), noticeably, until it got to the point where we felt that we must show the farmers that we were superior to them.

Then we went there with fifty-five state policemen; armed with riot guns, rifles, revolvers and gas bombs. (Laughter)

Just as soon as word was passed out that the doctors were coming, the farm bells rang, the whistle on the cannery blew, and it was astonishing to see how quickly the farmers gathered for a fight.

But, when the police convinced them that we were in earnest, they turned tail and went away. We proceeded with the work and accomplished it.

When we took them into court, they were convicted. We have been uniformly successful in winning all of our cases, except one. That was a minor case where two reactors disappeared. We had no proof that the owner violated the quarantine; nobody saw him take these cows away. He testified that he was in the city when the cows disappeared: So, of course, we couldn't convict him, in the absence of any direct evidence of the fact that he himself had removed the cows.

We have had a number of similar cases in which we convicted the defendants because we had the evidence. In some cases it was largely circumstantial, but it was sufficient to convince the court and the jury that the defendants were guilty.

We have had other cases in which arrests were made for interfering with the state officials in the performance of their duty, and we convicted them on those charges.

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### Court Upholds Decision on Ergot

The authority of the Secretary of Agriculture and the Secretary of the Treasury to determine whether or not certain crude ergot offered for importation into this country is adulterated or misbranded, within the meaning of the federal Food and Drugs Act, was upheld by the District of Columbia Court of Appeals, May 5, in an opinion by Chief Justice Martin.

The Court of Appeals affirmed the action of the District Supreme Court which had dismissed an injunction proceeding brought by a New York importer of ergot, to prevent the officials from admitting into the country crude ergot of rye which, he alleged, was illegal and unfit for use, and which would be in competition with importations made by him.

The importer claimed that he had in store large quantities of standard ergot of rye and that he would suffer great loss if the ergot in question were allowed to be put on the market.

The court found that the officials were vested with authority to pass upon the admissibility of the importations complained of and that the bill failed to allege facts upon which it could be inferred that the action of the officials in regard to the article involved was capricious, arbitrary, or in excess of their lawful powers under the statute.

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### Northwestern Veterinarians to Meet at Chehalis

The Northwest Veterinary Medical Association, consisting of the Washington, Oregon and British Columbia Veterinary Medical associations, will meet this summer at Chehalis, Washington. The dates for the joint meeting are July 14-15-16, according to an announcement made by Dr. Clifford Ackley, secretary of the Washington Association.

## PARASITISM AND FISTULOUS WITHERS\*

By JAMES E. ACKERT, *Manhattan, Kans.*, and W. S. O'NEAL,  
*St. Charles, Mo.*

### INTRODUCTION

The finding of filariae in cases of fistulous withers in this country by Van Volkenberg<sup>1</sup> and by Caslick<sup>2</sup> led the writers to look for this parasite in the ligamentum nuchae of the horses that were brought to the local veterinary clinic. During 1925-26, ten of the 12 ligaments examined showed filariasis by the presence of the worms or by their calcified bodies. This high percentage of infestation and the finding of new diagnostic characters for this parasite convinced the writers that a record should be made of them.

### MATERIAL AND METHODS

Sources of material included diseased sections of the ligamentum nuchae and entire ligaments from operative surgery subjects and from animals subjected to postmortem examination. The sections of ligaments to be examined were placed in glass chambers and covered with distilled water. The search for the parasite was conducted with the aid of fine forceps in direct sunlight or in the rays of a 75-watt electric lamp. To the unaided eye the parasite usually appeared as a shining white worm, of about the diameter of No. 50 sewing thread, projecting a variable distance from the surface of the ligament. Attention was especially directed to areas where the longitudinal yellow fibers of the ligaments were separated by masses of white fibrous tissue. The parasites were frequently found embedded in this tissue, and as the masses of it contrasted with the longitudinal yellow fibers, the search for the parasites was facilitated. Occasionally, worms were found also in the deep fascia near the ligament (fig. 1). Within the tissues, however, the worms so resembled the fibers as to make it impossible to follow the course of the parasites by microdissection. Hence, for removal, the protruding worm was drawn steadily with the aid of the forceps, until a portion of it gave way. By this method, one whole male worm was removed and many fragments, including anterior and posterior ends, and

\*Contribution No. 117 from the Department of Zoology, and No. 46 from the Department of Veterinary Medicine, Agricultural Experiment Station, Kansas State Agricultural College. Received for publication, December 30, 1929.



other portions of both male and female specimens. These specimens were preserved in 5 per cent formol for study.

#### DESCRIPTION OF THE PARASITE

While the structure of the filariae thus obtained from the ligamentum nuchae does not coincide in every detail with the description given by Railliet and Henry<sup>3</sup> for *Onchocerca cervicalis*, the diagnostic characters so closely resemble those given for *O. cervicalis* as to convince the writers that the worms in question are *O. cervicalis*.

#### THE GENUS ONCHOCERCA DIESING, 1841

Filariae of this genus filiform, the female not being swollen posteriorly; mouth simple and not surrounded by lips or papillae (or if these are present they are very small); cuticle, always in the female, especially towards the middle of the body, and sometimes in the male, thick, transversely striated, and reinforced externally by spiral thickenings which are often interrupted in the lateral fields; esophagus relatively short and not clearly divided into two portions. Male: posterior extremity spirally coiled; caudal alae usually absent, four circumanal papillae, and also one or more papillae in front of and behind these; spicules unequal. Female: vulva in the anterior esophageal region. Microfilariae unsheathed.

#### ONCHOCERCA CERVICALIS RAILLIET AND HENRY, 1910

With the characters of the genus. Specimens of both sexes extremely elongate and threadlike, being interwoven *in situ* in the connective tissue and among the muscle bundles (fig. 1); transverse cuticular striations marked throughout most of the length of the worms and spiral thickenings of external reinforced cuticle conspicuous in the central portions of the bodies of both males and females (fig. 5). Mouth surrounded by four very small papillae (fig. 2); esophageal bulb not prominent.

*Male*: 7.4 to 11.6 cm. long by .144 to .161 mm. wide (base of esophagus); average length, 9.5 cm.; average width, .152 mm. Esophagus (fig. 2, oe), 1.45 to 2.624 mm. long by .082 to .098 mm. wide at base; average length, 2.179 mm.; average width, .089 mm. Nerve ring (fig. 2, nr), .126 to .277 mm. from anterior end; average, .221 mm. Anus from posterior end of body, .115 mm.; width of body at anus (dorso-ventral), .066 to .073 mm.; average, .070 mm. Posterior end of body rounded, beset with seven pairs of papillae, one pair of preanal (fig. 7, pp), four pairs of anal (fig. 7,

anp) and two pairs of postanal papillae (fig. 7, cp) near tip of tail. Long spicule (fig. 7, lsp) sharply pointed at distal end, .284 to .328 mm. long; average .309 mm. Short spicule (fig. 7, ssp) rounded and slightly hooked at distal end, .091 to .105 mm. long; average, .194 mm.

Transverse striations and spiral cuticular thickenings (fig. 5, ts and st), absent at the anterior end, begin faintly and coincide at about the middle of the esophagus. Toward the middle of the body both structures become more distinct, there being four transverse striations to each spiral thickening in this region. Posteriorly, both structures become less prominent and finally disappear in the region of the tail.

*Female*: 30 cm. (Caslick<sup>1</sup>) long; .144 to .360 mm. wide, average .233 mm. Esophagus (fig. 2, oe), 2.017 to 2.565 mm. long by .07 to .108 mm. at bulb; average length, 2.298 mm.; average width, .088 mm. at bulb. Nerve ring (fig. 2, nr) .210 to .248 mm. from anterior end; average, .229 mm. Anus (fig. 3, an) from posterior end, .228 to .266 mm.; average, .246 mm.; width of body at anus (dorsoventral), .077 to .081 mm.; average, .079 mm. Vulva (fig. 2, v) from anterior end, .59 mm. Vagina (fig. 4, va), with slight crook and comparatively short, joins two uteri (fig. 4, u), one of which extends anteriorly for a short distance and then posteriorly parallel with the other uterus (fig. 5, u). Eggs (fig. 6),

#### EXPLANATION OF PLATE I

All drawings of *Onchocerca cervicalis* made with aid of camera lucida and enlarged.

#### Abbreviations

an —anus  
anp—anal papillae  
cp —caudal papillae  
i —intestine  
lsp—long spicule  
nr —nerve ring  
oe —esophagus  
p —papillae  
pp —preanal papillae  
ssp—short spicule  
st —spiral thickenings  
ts —transverse striations  
u —uterus  
v —vulva  
va —vagina

#### Figures

- Fig. 1. Portions of worms free and in connective tissue.  
Fig. 2. Anterior extremity.  
Fig. 3. Posterior extremity of female.  
Fig. 4. Vagina and proximal portions of uteri.  
Fig. 5. Central portion of female.  
Fig. 6. Embryonated eggs.  
Fig. 7. Posterior extremity of male.



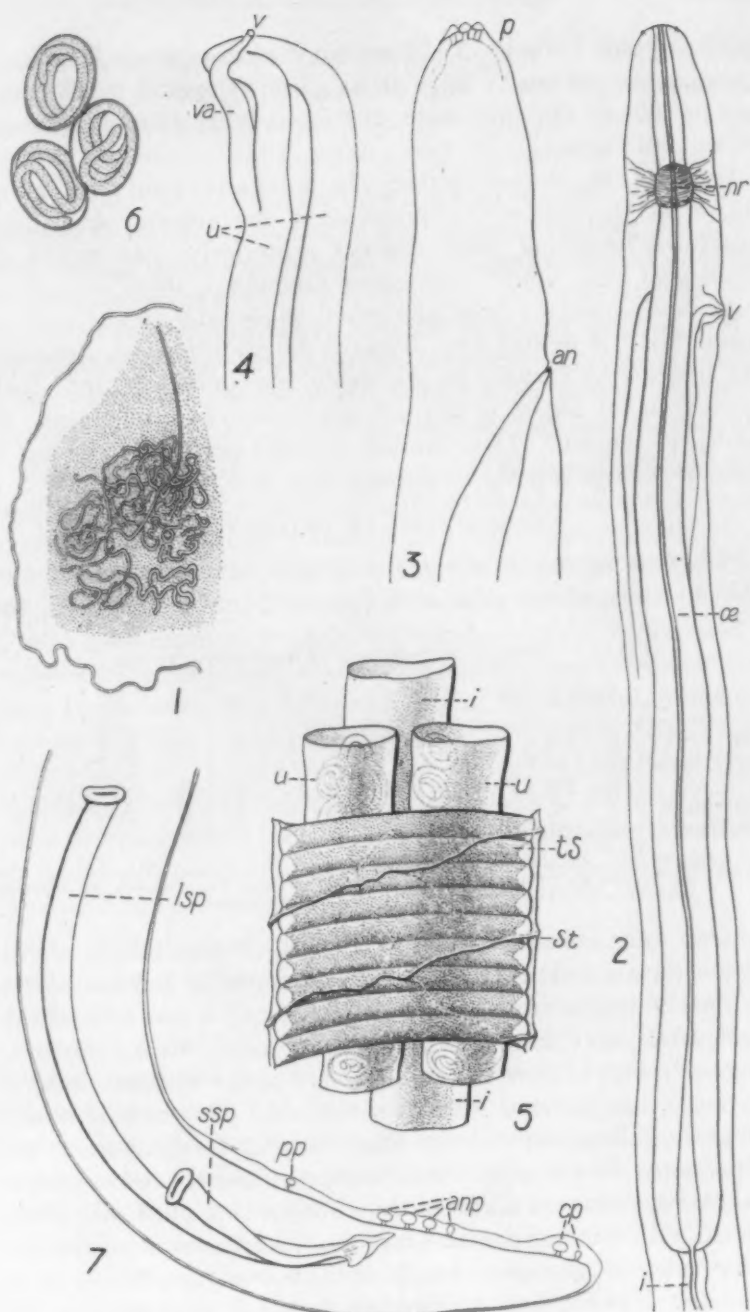


PLATE I

35-42 microns long by 21-28 microns wide; average length, 38 microns; average width, 26 microns. Embryos, .217 to .238 mm. long by .004 to .005 mm. wide; average length, .23 mm.; average width, .0043 mm.

Traces of transverse striations (fig. 5, ts) and spiral thickenings (fig. 5, st) present and coincident at the anterior end, both structures becoming more distinct posteriorly. At region of esophageal bulb, spiral thickenings prominent, there being four transverse striations from one spiral thickening to the next, a distance of .038 to .053 mm. Toward the posterior end, striations and thickenings become progressively less prominent until both coincide in the region of the tail, where both continue faintly to the tip of the tail. The rounded terminal portion of the tail is beset with three prominent papillae (fig. 3, p.).

#### EXAMINATIONS OF LIGAMENTS

The principal results of examinations of ligaments are given in table I, which shows that with the exception of one mule, the

TABLE I—Data on examinations of ligamentum nuchae

SUBJECT	1	2	3	4	5	6	7	8	9	10	11	12
Host	E	EA	E	E	E	E	E	E	E	E	E	E
Source	FW											
	PE	PE	FW	FW	SE	SE	PE	SE	SE	PM	PM	PM
<i>O. cervicalis</i>	P	N	N	P	P	P	P	P	P	P	P	N
Calcification	P	N	P	P	N	P	N	P	P	P	P	N

Legend: E=Equine; EA=Equiassini; FW=Fistulous Withers; PE=Poll-evil; SE=Surgical Exercises; PM=Postmortem; P=Positive; and N=Negative.

subjects were horses. In subject 1, which was suffering with septic atlantal bursitis and septic supraspinous bursitis, seven portions of worms from 21 to 49 mm. in length and several calcified areas were found in 320 gm. of necrotic and diseased ligament removed from the highest point of the withers. Subject 2, a mule, was affected with fistulous poll. The examination of 680 gm. of tissue showed one characteristic fistulous tract, but no parasites were found. From a supraspinous abscess (subject 3) there was removed a liter of thick ropy serum filled with tissue débris. While no live parasites were isolated, the serum contained many calcified granules, which indicated an infestation of *O. cervicalis*. From this horse (subject 4), when returned a month later, there was removed 30 gm. of necrotic tissue, in which were found two sizable portions of live worms, one being an anterior extremity. The ligament of a horse showing no symptoms of

fistulous withers or of poll-evil (subject 5) was examined with the result that several portions of *O. cervicalis* were found deeply embedded in one small area. The tissue around the worm showed a slight hyperemia, but no evidence of calcification.

A section of a ligament removed in cervical desmotomy (subject 6) showed portions of a worm at once. Hyperemia of the surrounding tissue was marked. Subsequent examination of the whole ligament gave evidences of *O. cervicalis* in all portions of it, the infestation being heaviest at the poll, and next heaviest in the region between the poll and the withers. Just anterior to the withers, several encapsulated worms were found, while the portion of the ligament over the withers was heavily calcified.

Examination of 50 gm. of ligament from a poll-evil operation (subject 7) showed several portions of *O. cervicalis* and hemorrhages in the surrounding tissue. In another case (subject 8) 770 gm. of ligament removed from the region of the withers had, among other portions of worms, an anterior extremity 10 cm. long. The excised ligament contained a purulent center surrounded by a distinct inflammatory zone and included many calcified areas, some hard, but others softened. One of the latter with a cheesy texture contained fragments of a calcified worm. Subjects 9, 10 and 11, from 12 to 20 years of age, were all heavily infested and calcified, subject 11 having a history of open fistulous withers upon three successive occasions and one open poll-evil. Subject 12, a colt 16 months of age, showed no parasites, calcification or macroscopic pathological lesions.

The pathological anatomy of the infested tissue was best studied in the entire ligaments. Light infestation, as in subjects 5 and 7, revealed only a light zone of hyperemia about the parasites, with some increase in the amount of white fibrous tissue; whereas in heavy infestation, as in subject 6, there was marked hyperemia and heavy calcification. Some of the ligaments presented only granular calcification, while in others gradations existed up to a heavy calcification, in which more than one-half of the ligament in the region of the withers was composed of calcified areas. Single calcified areas ranged from the size of a pin-head up to that of a walnut. Living parasites were never found in or near the more densely calcified areas, but calcified segments of the worms were taken from the calcified areas. When these segments were examined with the low power of the compound microscope, the characteristic transverse striations of

the parasite were readily discernable. Other pathological conditions which may have resulted from the parasitism were several areas filled with a cheesy, necrotic material, and a small abscess (subject 8) surrounded by an inflammatory zone in the infested portion of the ligament.

Subject 2 was interesting in that this was the only soliped, with external evidence of a diseased condition of withers or poll, which failed to reveal filariae or calcification. The diseased tissue in this case seemed confined to a fistulous tract passing from the skin, through the nuchal fat, down to the ligamentum nuchae. Only a very small amount of the ligament was removed and this may account for the failure to find worms, as in further study of entire ligaments the living filariae were always found a little distance from the area suffering the greatest pathological change.

The possibility of establishing a calcified area as a pathognomic symptom of the presence of the parasite was suggested in subjects 3 and 4. The examination of a liter of tissue debris and coagulated serum removed from a supraspinous abscess in subject 3 showed numerous calcified granules throughout the pus, but no worms were found. When the horse (subject 4) was returned a month later, many *O. cervicalis* segments were found in pieces of the diseased ligament removed through drainage openings. This possibility is of clinical importance in that the calcified areas are often subject to digital palpation through the unbroken skin and are readily palpated through drainage openings made for the relief of fistulous withers or poll-evil. The absence of calcified areas, however, does not establish the absence of the parasite, as subjects 5 and 7 were infested without calcification.

#### DISCUSSION

That the conditions known as fistulous withers and poll-evil are probably caused by *O. cervicalis* has been held by Robson<sup>4</sup> and others who have studied the parasite *in situ*. The disintegration of tissue surrounding the worm and the gradations in the progress of the disease point strongly to an etiological relationship between the worms and the diseased conditions. The case is strengthened by the pathological effects of *O. reticulata*, which, according to Hall,<sup>5</sup> causes in horses hypertrophy of the tendons and ligaments, the formation of nodules and a persistent dropsical condition. That these diseases of the ligamentum nuchae probably are not due to traumatism was shown by Davis,<sup>6</sup> who had no cases of poll-evil or fistulous withers among 120 work horses in London

during 20 years, even though many of the horses had suffered with various kinds of wounds and bruises about the neck and shoulders. In the country, however, and especially in certain regions, both of these diseases were of common occurrence, the indications being that the conditions were due to infection rather than to traumatisms.

The finding of evidence of the bacillus of Bang by Rinjard and Hilger<sup>7</sup> in cases of fistulous withers in horses in France and the recent confirmation in this country by Fitch et al<sup>8</sup> are pertinent. Initiation of the disease by the migrating *Onchocerca* could well be developed to the pyogenic stage by the Bang bacillus. Whether either or both of these organisms function in the production of these diseases of the ligamentum nuchae can be determined only by experimental studies.

The means of transmission of *O. cervicalis* from one horse to another is unknown. The filariae whose life cycles are known require such intermediate hosts as dung beetles, mosquitoes and flies. Blacklock<sup>9</sup> has recently shown that the microfilariae (larvae) of *O. volvulus* may develop in the black fly, *Simulium damnosum*. As *O. cervicalis* is ovoviviparous, the attacks of mosquitoes, black flies and tabanids would furnish ample opportunity for withdrawing the microfilariae from the equine hosts. The frequency and severity of the bites of several species of tabanid flies would tend to place them under suspicion in this region.

#### SUMMARY

1. Ten of twelve examinations of portions of the ligamentum nuchae showed either portions of the parasitic worm, *Onchocerca cervicalis*, or calcified areas characteristic of previous infestations of *O. cervicalis*.

2. Studies on the anatomy of living or of well-cleared specimens of *O. cervicalis* have given the following new diagnostic characters for this species: (a) four very small oral papillae, (b) three prominent terminal papillae on the tail of the female, and (c) location of the nerve ring.

#### ACKNOWLEDGMENT

Indebtedness is acknowledged to Dr. R. R. Dykstra and Dr. E. J. Frick, for surgical assistance, and to Mr. S. Fred Prince, for aid in making the drawings of the worms.

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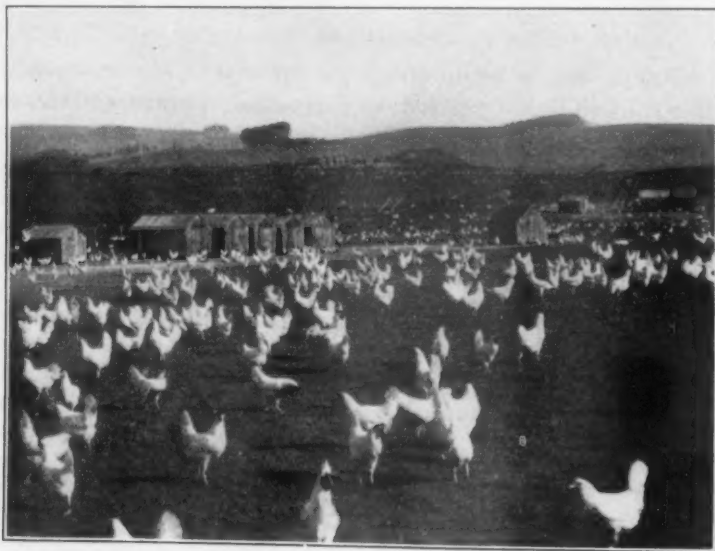
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### Fort Dodge Bio-Chemic Review

A newcomer has joined the already large family of veterinary house organs—*The Fort Dodge Bio-Chemic Review*. As the name indicates, this lusty youngster is the product of the Fort Dodge Serum Company, of Fort Dodge, Iowa. Number 1 of volume I bears a date line of April-May, indicating that visits of this publication will be bi-monthly.

Printed in two colors throughout, the 32 pages of the *Review* present a very pleasing appearance. It is not overloaded with advertisements and the reading matter is of a high class. The illustrations are carefully selected and well reproduced. The sponsors of the *Review* may well feel proud of the first issue, particularly Dr. A. H. Quinn, Jr., upon whose shoulders have fallen the responsibilities of the editorship.



Scene on California Poultry Ranch



## SOME ASPECTS OF THE SOCIOLOGIC, BIOLOGIC AND ECONOMIC PHASES OF THE TUBERCULOSIS PROBLEM\*

By A. F. SCHALK, *Fargo, North Dakota*

*North Dakota Agricultural College*

In the realm of medical and sanitary science there is perhaps no one condition that has been more insidious in its course, attended by more grief and sorrow and greater economic significance and at the same time more colorful, than that of tuberculosis.

A human disease designated as consumption and phthisis antedated medieval times and had its origin coexistent with the dawn of civilization. Some centuries ago, ruminants manifested a disease condition termed "pearls disease," and comparatively recently we have come to recognize a characteristic nodular disease in fowl, known as "spotted livers." However, it is now definitely established that all of these disease conditions are manifestations of the pathogenic activities of the various types of *Mycobacterium tuberculosis*, resulting in that specific microbial disease—tuberculosis.

The disease in man is primarily one of close contacts encountered by cohabitation, in other words a product of socialization and civilization of the human race. Likewise, in the domain of the lower animals it is evidently the result of the various factors involved in domestication and utilization of animals for man's immediate needs. Villemin very aptly said, in 1868, that "a phthisical soldier is as dangerous to his mess-mates as a glandered horse is to his team-mate." While this statement was considered somewhat previous by many at that time, its wisdom and correctness has been proven a thousand fold, and it applies with equal force to man, beast and fowl, where sufficiently intimate contacts are made and favorable environmental conditions encountered in their modes of living as dominated by man in his sweep through the centuries for a higher scale of living and a higher plane of civilization.

Undoubtedly tuberculosis, since the earliest times, has been the most constant and consistent threat to man's existence as viewed from a biological standpoint. In fact it has in many

\*Presented at meeting of Section N (Medical Sciences) of the American Association for the Advancement of Science, Des Moines, Iowa, December 31, 1929.

instances wiped out entire families and there was a period of time when some authorities began to wonder about the possibility of it exterminating the race.

Fortunately; however, the tide turned and the present generation is witness to a kaleidoscopic picture which vividly portrays a very marked and definite decline in both the morbidity and mortality from this insidious disease. One naturally makes the inquiry, "Why the decisive retrogression of the disease at this stage of civilization?" Of course, some of it can be attributed to fruits of the systematic and comprehensive educational campaigns that have been instituted by practically all civilized nations, which have resulted in the formulation and practice of rather definite sanitary and hygienic measures in connection with tuberculosis in the human family.

#### HYPOTHESES PRECEDE DISCOVERIES

Unfortunately, education, hygiene and sanitation do not satisfactorily account for the manifest decline in the disease. Certainly other factors or phenomena of an indeterminate nature are involved. Just what they are would be very difficult definitely to say, from our present knowledge on the subject. Any hypothesis advanced would be only of a speculative nature, which may require the ages to come to verify or disprove. However, history shows that practically all truly great scientific facts and findings are preceded by hypotheses, or more or less theorizing, and this particular field is certainly no exception.

In this connection it is the belief of many workers and thinkers engaged in tuberculosis investigations that the decline can be best explained on the theories of increased resistance and immunity acquired by the race, and possibly accompanied by some slight decreased virulence or modification of the causative agent—the tuberculosis germs. In our comprehensive social, commercial and industrial fabrics, attended by the necessary activities and functions for their normal execution, we find unavoidable contacts of the myriads of peoples involved, most excellent opportunities for direct or indirect exposure to the tuberculosis germs as spread by the known and unknown carriers of the disease. Consequently, for centuries, generation after generation has been taking into their bodies the organisms in varying numbers. When the dosages are sufficiently large, manifest disease results. When minimal numbers of germs are involved,

the host, in all probability, builds up a resistance or immunity which may prevent subsequent infection.

Further, in this manner, is it not possible for succeeding generations to inherit some degree of immunity sufficient to protect them from the usual ravages of the disease? This hypothesis appears also to have a true corollary in the case of the child and adult man in connection with the bovine type of tuberculosis. The child in the juvenile period of life is readily susceptible to bovine tuberculosis, whereas when it attains adult life it is practically free from bovine infection. Lastly, there is the probability that the human race is developing a partial resistance or tolerance to human type infection by more or less continually taking into their bodies small numbers of other strains of tuberculosis, and possibly other acid-fast organisms which fall into this class of germs.

#### HIGH LIGHTS IN TUBERCULOSIS HISTORY

Although tuberculosis is an age-old disease, the more important high lights in tuberculosis history have been established during comparatively recent times. In 1865, Villemin proved its infectious nature when he succeeded in transmitting the disease from man and cattle to animals experimentally. A few years later, in 1882, Robert Koch, with the aid of newly devised staining methods, discovered the tuberculosis organism and, in 1891, this same savant gave to the world the first tuberculin, a product absolutely indispensable for the present-day diagnosis of the disease in animals. If we add to these truly significant findings the initiation of the Accredited Herd Plan and the nation-wide Tuberculosis Eradication Campaign inaugurated in 1917, we have enumerated the most conspicuous and noteworthy milestones in the annals of this disease.

The latter movement constitutes by far the most comprehensive sanitary project that has been launched since the beginning of time. While this magnanimous campaign was begun primarily for the specific purpose of eradicating tuberculosis from our cattle herds, the work had hardly progressed beyond the initial stages when it was readily realized that grave complications were at hand. At the very outset obstacles were encountered that called for a program of much wider scope if the original purpose of the campaign were to be accomplished.

Reasoning from our previous stock of knowledge on the subject, it was thought by all, that, if cattle were freed from the disease,

tuberculosis would automatically disappear from swine. This conception soon proved fallacious, as determined by actual field studies, which were almost simultaneously confirmed by timely laboratory researches that were in progress at the time. As a matter of fact, records from many packing-houses in some sections of the country, where federal meat inspection was maintained, revealed the amazing information that they continued to receive a high percentage of tuberculosis-infected hogs from counties and areas in which the cattle had been freed from the disease. Subsequent investigations quite conclusively proved that it was not the bovine type of the organism that was responsible for these mysterious swine infections but that it was the avian variety of the germ that was the causative agent. Special studies instituted at different experiment stations involving specific typing methods brought out the startling fact that from 60 to 88.5 per cent of the hogs retained for tuberculosis in some establishments were infected with the avian type of the organism.

#### TRANSMISSIBILITY OF THE VARIOUS TYPES

This classical finding, together with some well established data pertaining to the presence of bovine tuberculosis in the human family, aroused unusual interest in the general subject as it applies to the possibilities of transmissibility of the various types of tuberculosis among the different host species, including domesticated beasts and fowl and the human race. Consequently, there has developed, among the workers in tuberculosis, within a few short years, a much larger and more comprehensive idea of the subject in general. As a result of this wider viewpoint and greater conception, practically all concerned in tuberculosis control and eradication work are now thinking in terms of The Greater Tuberculosis Problem.

However logical hypotheses may seem in any field of science, the fact remains that they are practically valueless until their worth is disproven or has been transformed into material facts. This is the exact present status of the various so-called types of *Mycobacterium tuberculosis* as they apply to the different animal hosts.

The established classification at this time recognizes the human, bovine and avian types of the organism as they apply to man, beast and fowl. These type designations are based principally upon their pathogenic and antigenic proclivities upon their natural or optimum hosts: humans, cattle and the common

barnyard fowl. Having some evidences at hand that these various types have invaded some foreign hosts, the question naturally arises, to what extent is this applicable, and is it of sufficient importance to have an economic bearing upon the tuberculosis eradication problem.

In order to approach this phase of the problem intelligently, it is quite necessary that we are reasonably certain about the bacillary strains of the organisms involved. While microscopic examination of stained preparations and careful studies of the morphological characteristics of the various strains by cultural methods afford some means of differentiation, it remains for the experimental inoculation of animals—cavia, rabbits, and the common barnyard fowl—for the most reliable and dependable way of distinguishing bacillary types of the organism. Of course this method is not perfect and infallible by any means and it cannot be expected to place accurately the so-called intermediate, transitional or aberrant types of the germ that are accountable for some of the irregularities and idiosyncrasies encountered in typing work. However, it is the best method available at this stage of scientific progress and will have to be depended upon until more accurate methods are developed. Briefly, this typing method asserts itself by comparative infectivity of the cavia, rabbit and chicken by the various bacillary strains of the organism. It is as follows:

BACILLARY TYPE	CAVIA	RABBIT	FOWL
Bovine.....	+ + +	+ + +	0
Human.....	+ + +	+	0
Avian.....	0	+ + +	+ + +

Legend: + + +, readily infected; +, slightly infected; 0, non-susceptible.

Naturally, the virulence of the organism and the resistance of the host are factors that may slightly influence the degree of infectivity but, on the whole, the corollaries are reliable.

Upon this basis of designation the human type of the organism exerts its greatest infectivity upon members of the human family, where it has wrought untold grief and suffering through the ages. It is likewise practically as fatal in some breeds of monkeys and is also found in parrots, swine and dogs. In the latter species about 50 per cent of the disease can be attributed to human germs. The bovine type is recognized by most authorities as the most virulent of all bacillary strains and is likewise attended by a



wider range of infectivity in the field of foreign hosts. It is preëminently the type incident to its natural host, the bovines, and is found in practically all generalized tuberculosis in swine. In addition, about 50 per cent of dog tuberculosis, and a majority of the cases found in the house cat, type out in accordance with the bovine strain. Lastly, the horse and sheep occasionally become infected with the disease, in which most cases run true to the bovine germ.

The avian bacillus is the youngest member of the tuberculosis family which has come to our attention, but little more than a half-century ago. Its entry into the tuberculosis picture was rather slow and attended with considerable doubt on many sides. However, it has been quite conspicuous in many sections of our country during the past fifteen years. Naturally it exerts its greatest and most consistent manifestations in the avian family. It more particularly confines its depredations to the gallinaceous birds, making its greatest inroads on the domestic fowl of this class and those of field and forest when confined in captivity. The disease is exceptionally rare in aquatic birds, even when confined in captivity for long periods of time.

#### SWINE CONTRACT AVIAN TUBERCULOSIS

Recently it has been learned that American swine, on farms where the disease is prevalent in poultry, are very commonly infected with the avian disease. This condition is so common that its economic importance is perhaps equal to that of the disease in its natural host, the common barnyard fowl. While the avian type of the disease is occasionally met with in field cases in cattle and sheep, it appears as though it is not of a threatening nature in those classes of live stock.

In an effort to determine more definitely the possibilities of transmissibility of the various bacillary strains of this organism to foreign or rather widely differentiated biologic species, many ingenious studies have been in progress during the last decade. By carefully planned exposure trials, by actual ingestion of tuberculous material and by direct inoculation of tuberculosis viruses, together with most careful typing of the organisms involved, we have been able to obtain some very valuable data upon the subject in question.

Most important, perhaps, at least from a biologic and sociologic viewpoint, is the probability of transmission of the bovine and avian infections to man. Although man has not been purposely

exposed to, forcibly ingested, or premeditatively inoculated with, these strains of tuberculosis, nevertheless, he has unknowingly served as an experiment animal *par excellence* for this purpose. Countless people throughout the country have been consuming raw milk from untested cattle and meat products emanating from establishments that do not maintain veterinary inspection. Therefore, the opportunities for consuming these germs are ideal in many respects.

While these conditions have prevailed for centuries, scientific inquiry has been made into the problem only during quite recent times. Accumulated data from these investigations show unimpeachable evidence that bovine tuberculosis is transmissible to the human race in no small measure.

It was very unfortunate, indeed, for the cause of tuberculosis, when Robert Koch, in 1901, appeared before the International Congress on Tuberculosis and gave to the world the following statement:

I should estimate the extent of infection by milk and by flesh of tuberculous cattle, and the butter made from this milk, as hardly greater than that of hereditary transmission, and I therefore do not deem it advisable to take any measures against it.

How about this? Many scholarly investigators like Fibiger, Woodhead, Arloing, Ravenel and others took sharp issue with Koch on the subject and contended that the bovine disease was contracted by humans. However, from Koch's authoritative position upon matters pertaining to tuberculosis, an overwhelming majority, including the medical profession, were inclined to support his view, with the result that tuberculosis progress has been stayed nearly a quarter of a century.

Numerous studies have been made since then that have resulted unfavorably to Koch's theory. After nine years of researches, the British Royal Commission reported:

We have investigated many instances of fatal tuberculosis in the human subject in which the disease was undoubtedly caused by a bacillus of the bovine type and by nothing else. \* \* \* Man must therefore be added to the list of animals notably susceptible to bovine tubercle bacilli.

Wang compiled statistics from Western Europe, British Isles and the United States up to the War and found that, of 2516 cases of all ages, 16 per cent were of the bovine type. Again he found that, of 1437 non-pulmonary cases, 28 per cent were of bovine origin. The statistics of Park and Krumweide, of New York, and those of Griffith and Cobbett, of England, as well as many others in various parts of the world, coincide quite favorably with those quoted above.

These facts and figures are self-evident and truly significant. The problem exists and we have it to contend with and to solve. Health officers can no longer ignore it. Its dangers reach down to every consumer of dairy products. Therefore, it behooves all public health and sanitary officials, as well as physicians and veterinarians in general, with those who are responsible for our dairy and beef production, to join hands in a comprehensive program of sympathetic and hearty cooperation to "complete the job" in the eradication of this disease from our herds.

With reference to the avian organism invading the human race, it may be said that there is but very little data of a reliable nature available. Inasmuch as this form of tuberculosis has a very short history, the opportunity for the accumulation of well established knowledge pertaining to the subject is somewhat limited. Consequently, our information on this phase of the subject is quite meagre and incomplete in comparison to that which we have on the other bacillary strains.

#### MAN NOT SUSCEPTIBLE TO AVIAN TYPE

While it is generally acknowledged that man is relatively intolerant to the avian disease, absolute evidence as to this, as based upon careful experimentation, is conspicuous by its absence. Of course, the time factor in the brief history of the disease is the principal limiting factor. However, recent researches that have been conducted upon the subject show rather conclusively that man is quite insusceptible or relatively immune to the avian germs. Another factor highly worthy of consideration in connection herewith is that the human family does not actually consume as many live, viable avian germs in its daily rations as those of bovine origin. Practically all people manifest a marked predilection for thoroughly cooked poultry as compared to beef products, and recent data show that the avian germs are found in less than 1 per cent of the eggs from tuberculous hens, and then they are present in comparatively small numbers.

Again, turning to the economic aspect of the question, may we not ask, to what extent does the avian organism attack and infect the bovine species of animals? This point has been repeatedly raised, during the past few years, by sanitarians and veterinarians who are actively engaged in the great campaign for the eradication of tuberculosis from our herds. Many veterinarians who were doing the actual testing of the cattle on the farms were prone to believe that the transmissibility of the avian disease to cattle

was not only admissible but highly probable and that it was this member of the tuberculosis family that was responsible for some of the irregularities and idiosyncrasies encountered in their testing work. To that end some special studies have been directed during the last decade which throw some light upon the subject. From these experiments it has been learned that cattle can be quite readily sensitized to avian tuberculosis to the extent that they react positively to avian tuberculin, but invariably fail to react to mammalian tuberculins of bovine and human origin. In practically all cases these sensitizations or states of allergy were of a temporary or transient nature, entirely fading out in the course of from three to six or seven months.

#### CATTLE RELATIVELY INSUSCEPTIBLE TO AVIAN DISEASE

These findings would indicate that such sensitized animals would not be detected by the usual test on cattle, where only human and bovine tuberculins were used as diagnostic agents. However, there is some evidence to the contrary, inasmuch as an occasional reacting animal is picked out with mammalian tuberculin, which, when examined at postmortem shows lesions of tuberculosis, which type out in accordance with the avian organism. It has been suggested by some authorities that this inconsistency might possibly be explained upon the basis of larger dosages or heavier loads of the germ. We who have worked on the problem can hardly subscribe to this hypothesis. Our studies have been conducted upon cattle that were confined in closed yards, cohabiting with large numbers of tuberculous fowls, where the exposure was intensive in nature and where the opportunities for the animals to consume large dosages of the avian organism were ideal.

When such sensitized reacting animals were subjected to autopsy at slaughter, visible lesions of the disease were rarely ever encountered. These results would suggest that the avian type of the organism does not ordinarily possess sufficient pathogenic proclivities to induce manifest lesions of the disease in bovine tissues. Of course, these few studies will not permit of definite conclusions on the subject, but they undoubtedly indicate that the avian type of tuberculosis possesses an exceedingly low grade of infectivity for cattle under ordinary conditions and that avian infection in cattle cannot be viewed with as much alarm as pertains to milk and beef hygiene at the present time.

Many more thoughts could be expressed and various other aspects of this comprehensive and far-reaching subject could be

discussed. However, as the problem stands at present, much more intensive study is required upon the different biologic phases of the tuberculosis organism. Among the more important and pressing items that are particularly calling for solution, may be mentioned the preparation of more specific and selective tuberculins and a more accurate measure of the virulence and a fuller knowledge of the environmental influences upon the tuberculosis organism, both within and outside of the animal body. When more knowledge of a dependable nature is brought to light pertaining to these puzzling and perplexing conditions, I firmly believe that the good work that has been in progress, in this very interesting field, will be carried to a more rapid and satisfactory conclusion.

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#### Missouri Veterinarians to Meet at Hannibal

Dr. J. D. Ray, secretary of the Missouri Veterinary Medical Association, announces that the summer meeting will be held at Hannibal, July 22-23-24. A special invitation is extended to the veterinarians of western Illinois to attend the Missouri meeting and enjoy the splendid program that has been arranged.



City Hall of Los Angeles



# A COMPARATIVE STUDY OF THE ROUTINE MACROSCOPIC AGGLUTINATION AND THE INTRACUTANEOUS (WATTLE) TESTS FOR BACTERIUM PULLORUM INFECTION IN POULTRY BREEDING STOCK

By LEO F. RETTGER, JAMES G. McALPINE and  
DAVID E. WARNER\*

*Departments of Animal Diseases and Poultry Husbandry, Storrs  
Agricultural Experiment Station, Storrs, Connecticut*

The world-wide occurrence of pullorum disease in chicks has assumed such economic importance that unless efficient methods of its control and ultimate eradication are adopted quite generally, the poultry industry must suffer irreparable loss, as indeed it is already doing in many sections of our country.

Based upon the generally accepted observations (1) that this disease of chicks is caused by a definite microorganism, *Bacterium pullorum*, (2) that the infection is transmitted directly from infected hens to their offspring through the egg, and (3) that infected breeding stock constitutes the real and permanent source of infection in the chicks, the efforts of investigators have for several years been directed against the carrier hen as the most important point in the vicious cycle.

The macroscopic agglutination test, as commonly used in the diagnosis of typhoid fever and first applied to pullorum disease by Jones,<sup>2</sup> is now being employed in numerous diagnostic poultry-disease laboratories. In the face of the more general and widespread application of this test, efforts have been made in various quarters to introduce other and newly devised substitute methods which are claimed, on the one hand, to be as efficient and reliable as this, and on the other, shorter, simpler and more economical.

One of these proposed substitute methods is that of Runnells<sup>3</sup> which is based on Huddleson's rapid agglutination test<sup>4</sup> for the diagnosis of bovine infectious abortion. Another is the one known as the intradermal or intracutaneous (wattle) test, which is similar to the method devised some years ago for the diagnosis of tuberculosis in barnyard fowl. The wattle test was first employed for the detection of pullorum disease carriers in breeding fowl by

\*Credit should go to William F. Kirkpatrick and Wayne N. Plastringe for their valuable co-operation in this investigation.

Received for publication, January 16, 1930.

Ward and Gallagher.<sup>5</sup> Several commercial brands of antigen (pullorin) used in this test have been given wide publicity.

Owing to the rapidly increasing interest in the wattle test, and at the same time the decidedly controversial situation existing regarding the actual merits of this method, the writers undertook a comparative study of the routine agglutination method, as quite generally used, and the wattle test, over a rather extended period of time. The work was further stimulated by requests from incubator and pullorin manufacturers for further information about the reliability of the test.

In the present investigation two distinct brands of pullorin were employed. Both were the products of well-known and recognized pullorin manufacturers. One was a clear, aqueous or saline extract of *Bacterium pullorum*, which was purported to contain the specific diagnostic agent of the original bacterial cells, and to be comparatively free from cell substances that may produce non-specific wattle reactions when employed in the prescribed way. The other brand of pullorin was of the cellular type and was supposed to have preserved in it intact the active pullorin principle.

The agglutination test was applied in the same manner as that used in the official routine serological diagnosis of pullorum infection in breeding stock in Connecticut, except that a much wider range of fowl serum dilutions was used in this investigation. Triple antigen was employed, and the dilutions of fowl serum were, as a rule: 1:25, 1:50, 1:100, 1:200, and 1:400. Readings were made after incubation for 48 hours at 37°C. These were checked by a second reading, after standing an additional 24 hours at room temperature. The results were indicated on the 4-plus basis, although the reaction was interpreted in the final analysis as positive when agglutination was complete in 1:25, 1:50 and 1:100 dilutions. Partial reactions in one or more of these dilutions are recorded as doubtful.

The investigation comprised two separate and distinct experiments, in both of which mature fowls were employed which came from infected and uninfected flocks which were under official test and supervision of the State Department of Domestic Animals, in its program of pullorum disease eradication. The hens were kept and cared for in regular poultry-houses by members of the College Poultry Department staff. In both experiments the wattle injections and subsequent examinations

of the wattles were made according to the directions of the manufacturers supplying the pullorin.

### EXPERIMENT I

This experiment was begun with 90 adult hens on December 1, 1927, and ended on October 14, 1928, when all of the birds which remained were slaughtered and subjected to postmortem examination and culture tests. They were of the Rhode Island Red breed, with a few exceptions.

Only one brand of pullorin was used. This was a well-known antigen solution (extract) which was marketed in small vials. It was clear and colorless. The pullorin was injected in 0.05-cc amounts on three separate occasions, namely, Dec. 30, 1927, April 20, 1928, and Sept. 24, 1928. The injections were made between the layers of the wattle skin or covering, with a long-barrel Luer syringe and a small-gauge toxin-antitoxin needle. The site of injection was at or about  $\frac{1}{4}$  inch from the edge of the wattle. The first injection was made in the left wattle; the second (about three months later) in the right, and the third (after a further interval of five months) in the left again.

Examinations of the treated wattles were made within 20 to 24 hours after the injection. Slight swellings were recorded as negative, along with those which were clearly non-reacting.\* The positive reactions were recorded on the 4-plus basis. All readings were made by two persons.

The macroscopic agglutination test was applied at eight different times, at intervals of ten days (early in the investigation) to five months. In all but one instance the chemical reaction of the antigen suspension was not corrected. In the test made on March 27, 1929, the final H-ion concentration was adjusted to pH 8.3-8.5, as was done in all of the agglutination tests conducted in experiment II. Blood samples were taken for testing on each of the three days that pullorin was injected. The final postmortem examination and culture tests on positive and doubtful subjects which remained were made 22½ months after the beginning of the experiment, and about a month after the last pullorin injection.

The results of experiment I are given in tables I and II. The birds in the A series (table I) were negative, and those in the R

\*The injections and the readings were made in accordance with the instructions of the manufacturers of this particular brand of pullorin.

TABLE I—Reactions obtained by the agglutination and intracutaneous tests employed in experiment I. A. Originally negative to the agglutination test

BIRD	12-1-27 AGGLUT.	12-20-27 AGGLUT.	12-30-27 INTRACUT.	12-30-27 AGGLUT.	1-18-28 AGGLUT.	2-15-28 AGGLUT.	3-27-28 pH 8.5*	4-20-28 INTRACUT.	8-28-28 AGGLUT.	9-25-28 INTRACUT.	9-25-28 AGGLUT.	Oct. & Nov. 1928	
												P. M.	CULT.
A 1	0	0	0 H	0	0	0	0	0	—	—	—	—	—
A 2	0	0	0	0	0	—	0	—	—	—	—	—	—
A 3	0	0	0	0	0	0	0	0	0	0	0	0	0
A 4	0	0	0	0	0	0	0	+	0	0	0	0	0
A 5	0	0	0	0	0	0	0	0	0	0	0	0	0
A 6	0	0	0	0	0	0	0	0	0	0	0	0	0
A 7	0	0	0	0	0	—	—	—	—	—	—	—	—
A 8	0	0	0	0	0	0	0	0	—	—	—	—	—
A 9	0	0	0	0	0	—	—	—	—	—	—	—	—
A 10	0	0	0	0	0	0	0	0 H	0	0	0	0	0
A 11	0	0	0 H	0	0	0	0	0	0	0	0	0	0
A 12	0	0	0	0	0	0	0	0	0	0	0	0	0
A 13	0	0	0	0	—	0	0	0	0	0	0	0	0
A 14	0	0	0	0	0	0	0	0 H	0	0	0	0	0
A 15	0	0	0	0	0	0	0	0	0	0 H	0	0	0
A 16	0	0	0	0	0	0	0	0	0	0	?	0	0
A 17	0	0	0	0	0	0	0	0	0	0	0	0	0
A 18	0	0	0	0	0	0	0	0	0	0	0	0	0
A 19	0	0	0	0	0	0	0	0 H	0	2+	0	0	0
A 20	0	0	0	0	0	0	0	0	0	0	0	0	0
A 21	0	0	0	0	0	0	0	0	0	2+	0	0	0
A 22	0	0	0	0	0	—	—	—	—	—	—	—	—
A 23	0	0	0	0	0	0	0	0	0	0	0	0	0
A 24	0	0	0	0	0	0	0	0	0	0	0	0	0
A 25	0	0	0	0	0	0	0	0	0	0	0	0	0
A 26	0	0	0	0	—	0	0	0	0	0	0	0	0
A 27	0	0	+	0	0	0	0	+	0	+	0	0	0
A 28	0	0	0	0	0	0	0	0	0	0	0	0	0
A 29	0	0	0 H	0	0	0	0	0	0	0	0	0	0
A 30	0	0	0	0	0	0	0	0	0	0	0	0	0
A 31	0	0	0	0	0	0	0	2+	0	0	0	0	0
A 32	0	0	0	0	0	0	0	0	0	0	0	0	0
A 33	0	0	0	0	—	—	—	—	—	—	—	—	—
A 34	0	0	0	0	0	0	0	0 H	—	—	—	—	—
A 35	0	0	0 H	0	0	—	—	—	—	—	—	—	—
A 36	0	0	0	0	—	0	0	0	0	0	0	0	0
A 37	0	0	0	0	—	0	0	0	0	0	0	0	0
A 38	0	0	0	0	0	0	0	0	0	0	0	0	0
A 39	0	0	0	0	—	0	0	0	0	0	0	0	0
A 40	0	0	0	0	0	0	0	0	0	0	0	0	0
A 41	0	0	0	0	0	0	0	0	0	0	0	—	—
B. B.	0	0	—	—	—	0	0	0	0	0	0	—	—

O = Negative reaction.

+ = Positive reaction.

H = Hemorrhage at site of injection.

— = No record except as stated in notes.

\*Agglutination.

Note 1. Died 2-4-28. Postmortem negative.

Note 2. Died 2-4-28. Postmortem and culture negative.

Note 3. Died 7-2-28. Postmortem and culture negative.

Note 4. Died 2-4-28. Postmortem negative.

Note 5. No postmortem record.

Note 6. No postmortem record.

Note 7. Died 2-9-28. Postmortem negative.

Note 8. Male. Died 10-15-28. Postmortem and culture negative.

series (table II) positive to the routine agglutination test at the outset, according to previous records of the birds. These two groups were kept apart throughout the experiment.

#### ORIGINALLY NEGATIVE GROUP (A)

In all of the seven agglutination tests that were conducted at widely different intervals, the correlation of the results with each other is almost complete. What must appear equally remarkable to the reader is the perfect agreement also between these tests and the results of the postmortem examinations and final cultural observations.

In so far as these records are concerned, there is also a reasonably close correlation between the agglutination tests and post-mortem results, on the one hand, and those obtained by the wattle injection method, on the other. A positive wattle reaction was obtained with five of the 42 birds in this group. In one instance a 1+ swelling was observed after the second test; one hen gave a 2+ reaction after the second injection; two a 2+ swelling after the third treatment; and one a 1+ reaction in each of the three intracutaneous tests.

If the results were based on qualitative differences, and not quantitative, and *all* visible swellings were recorded as positive, the discrepancies between the two methods would be very great, and 25 per cent or more of the birds would have to be regarded as doubtful or positive, on the strength of their giving at least slight wattle reactions.

It may be argued by some that previous injection of birds which reacted on the second and third tests may have partially immunized the hens or caused the formation of antibodies. With the small amount of antigen present in the injection dose, such a reaction would be highly improbable. And if, on the contrary, such partial immunization did take place, the method would have to be regarded as self-limiting and therefore of no value in repeat or follow-up tests on birds.

#### ORIGINALLY POSITIVE GROUP (R)

The results obtained with 39 different birds, all but two of which were positive in the original agglutination test, are recorded in table II. There is almost complete correlation here between the agglutination tests and the postmortem observations. There are, however, quite a number of instances in which the agglutination and wattle tests are at variance with each other.



TABLE II—Reactions obtained by the agglutination and intracutaneous tests employed in experiment I. B. Originally positive to the agglutination test

BIRD		12-1-27	12-20-27	12-30-27	12-30-27	1-18-28	2-15-28	3-27-28	4-20-28	8-28-28	9-25-28	9-25-28	Oct. & Nov. 1928		
		AGGLUT.	AGGLUT.	INTRACUT.	AGGLUT.	AGGLUT.	AGGLUT.	pH 8.5	INTRACUT.	AGGLUT.	INTRACUT.	AGGLUT.	P. M.	CULT.	
R 2		4+	4+	0	4+	4+	4+	4+	0	4+	0	3+	+	+	Note 1
R 3		4+	4+	0	4+	4+	4+	—	0	4+	0	4+	+	+	
R 6		4+	4+	4+	4+	4+	4+	4+	+	—	—	—	—	—	
R 9		4+	4+	+	4+	4+	?	4+	0	—	—	—	—	—	
R 10		4+	4+	0 H	4+	2+	4+	4+	+H	4+	0	4+	+	+	
R 12		?	?	0 H	?	0	0	0	0	0	0	0	0	0	
R 13		4+	4+	+	?	4+	4+	4+	0	4+	0 H	4+	+	?	
R 17		4+	4+	2+	4+	4+	4+	4+	0	4+	2+	4+	+	+	
R 21		3+	4+	+	4+	4+	4+	4+	+	0	+	4+	+	+	
R 22		4+	4+	+	2+	3+	4+	4+	+	4+	+	4+	+	+	
R 23		4+	4+	2+	4+	4+	4+	—	2+	4+	2+	4+	+	+	Note 2
R 24		2+	1+	0	2+	1+	?	2+	3+	2+	3+	1+	+	+	
R 25		4+	4+	3+	4+	4+	4+	4+	3+	4+	3+	4+	+	+	
R 26		4+	4+	+	3+	3+	3+	4+	0	—	—	—	—	—	
R 27		4+	4+	+	4+	4+	4+	4+	4+	4+	0	4+	+	+	
R 28		4+	4+	0	4+	3+	4+	4+	0	2+	3+	4+	+	+	
R 29		3+	2+	3+	4+	1+	?	4+	—	2+	4+	2+	+	+	
R 30		4+	4+	0	4+	4+	4+	4+	2+	—	—	—	—	—	
R 31		4+	4+	2+	4+	4+	4+	4+	3+	4+	2+	4+	+	0	
R 32		4+	4+	+	4+	4+	4+	4+	3+	4+	2+	4+	0	0	
R 33		2+	2+	3+	1+	1+	1+	2+	3+	1+	3+	?	+	+	
R 34		1+	?	2+	?	?	?	4+	2+	3+	2+	4+	+	+	
R 35		4+	4+	2+	?	4+	4+	4+	+	?	2+	2+	+	+	
R 36		?	?	4+	1+	?	2+	3+	4+	?	4+	1+	0	0	
R 37		4+	4+	3+	4+	?	4+	4+	3+	—	—	4+	+	+	
R 40		4+	4+	3+	4+	4+	?	4+	0	4+	2+	4+	+	+	
R 41		4+	4+	0	4+	4+	4+	—	0	4+	0	4+	+	+	
R 42		4+	4+	2+	4+	4+	4+	4+	0	4+	2+	4+	+	+	
R 44		4+	4+	+	?	?	?	4+	0	0	2+	3+	?	0	
R 46		4+	4+	+	4+	4+	4+	4+	0	4+	—	4+	+	+	
R 47		4+	4+	+	4+	4+	4+	—	0	—	—	—	—	—	
R 48		4+	4+	2+	4+	4+	4+	—	0	?	2+	4+	+	+	
R 49		4+	4+	3+	4+	4+	4+	4+	0	4+	2+	4+	+	+	
R 50		4+	4+	+	4+	4+	3+	—	—	—	—	—	—	—	
R 775		—	3+	+	4+	3+	0	4+	—	—	—	—	—	—	
R 778		—	2+	2+	?	?	2+	—	—	3+	—	0	+	+	
R 779		—	4+	+	4+	4+	4+	4+	—	4+	+	4+	+	+	
R 780		—	?	3+	1+	1+	0	?	—	?	4+	0	?	0	
R 176		—	—	—	—	—	0	1+	+	0	+	?	?	0	

O = Negative reaction.

+ = Positive reaction.

H = Hemorrhage at site of injection.

— = No record except as stated in notes.

Note 1. Died 8-23-28.

Note 2. Died 7-2-28. Postmortem negative.

The following birds were positive in all of the eight tests by the agglutination trials and negative by the intracutaneous in at least one out of the three tests: R2, R3, R10, R26, R27, R28, R30, R40, R41, R42, R46, and R49. Three of these, R2, R3, and R41, were negative by all three of the wattle tests.

Against these discrepancies will be noted but one single negative agglutination reaction which is at complete variance with the results of the seven other tests on the same bird, and with the postmortem and cultural observations, namely, the August 28 reaction for bird R21. The doubtful reactions do not enter largely into the picture and are of less concern than the others.

From the regularity of the agglutination reactions and their correlation with the postmortem data in table II one is led to assume that *Bact. pullorum* infection in this group of birds was well established, the positive hens being what are often referred to as confirmed reactors, as contrasted with birds that are passing through the first or through a new wave of pullorum infection, and for which the reaction curve may for a time be quite irregular or fluctuating.

## EXPERIMENT II

As stated before, a cellular vaccine was employed here in place of the aqueous extract brand employed in experiment I. The pullorin was received directly from the manufacturers as a dry powder. This was made up into a water suspension according to the instructions accompanying the package, and the prescribed amounts of the suspension injected into the wattle covering in the same manner as in the previous investigation. The wattle readings were made in 20-24 hours by two responsible persons. All of the agglutination tests were conducted with antigen suspensions having a final H-ion concentration of pH 8.3-8.5. Fifty-eight birds, including two males, were employed in this experiment. The results are presented in table III.

The last ten birds included in the table had not been tested previously. These were kept in the positive group from the beginning. The others were selected as negative or as positive reactors on the basis of at least one previous test, which was made before the birds were purchased and delivered. These two groups were kept apart during the experiment.

Of the 58 birds in the list, 31 were negative by the agglutination method at the outset, two doubtful, and the remaining 23 positive. The agglutination reactions of 28 of the originally negative birds

TABLE III—Reactions obtained by the agglutination test, and by the wattle test with cellular antigen

BIRD	3-19-29 AGGLUT.	4-5-29 AGGLUT.	4-19-29 INTRACUT.	4-19-29 AGGLUT.	4-28-29 INTRACUT.	MAY 1929		REMARKS
						P.	CULT.	
A1	0	0	Sl.	0	+	0?	0*	Two small blackish cysts in peritoneal cavity. Not at all typical. Ovary slightly questionable
2	0	0	0	0	2+	0	—	Bird normal and O. K.
3	0	0	0	0	2+	0	0	Two large hemorrhagic ova. Rest O. K.
4	0	0	Sl.	0	0	0	—	Flabby ova
5	0	0	+H	0	0	0	0	Fluid in peritoneal cavity. Atypical cyst adhering to omentum. Rest O. K.
6	0	0	3+	0	3+	?	0*	
7	0	0	Sl.	0	2+H	0	—	Ovary well developed and normal. Rest O. K.
8	0	0	+	0	+	0	—	Ova normal, well developed. Rest O. K.
9	0	0	2+	0	+	0	—	Ovary non-functioning. No pathological appearance in bird anywhere
10	0	0	+	0	2+	0	0	Liver tumor. Flabby ova
11	0	0	0	0	+	0	—	No pullorum ova. Long tumor-like body near ovary
12	0	0	+H	0	+	0	—	Ovary well developed and normal. Rest O. K.
13	0	0	0 H	0	0	0	—	All organs normal
14	0	0	0	0	+	0	—	O. K. in every way
15	0	0	0	0	2+	0	0	A few small atypical ova. Much fluid in peritoneal cavity
16	0	0	0 H	0	0	0	—	
17	0	0	+	0	Sl.	0	—	O. K. in every way
18	0	0	0 H	0	0	0	—	
19	0	0	0	0	2+	0	—	Large well developed ovary. Rest O. K.
20	0	0	+H	0	2+	0	—	
21	0	0	0	0	0	0	—	
22	0	0	Sl.	0	+	0	0	Tumor in spleen. Ovary O. K.
23	0	0	+	0	+	0	—	O. K. in every way. Ovary large
24	0	0	2+	0	0	?	0†	Under-developed ovary. Three very small atypical ova, hemorrhagic and flabby
25	0	0	0	0	Sl.	0	—0	
26	0	0	0	0	2+	0	—	Ova under-developed, blackish but negative. Rest O. K.
29	0	0	+	?	2+	0	0	No typical ova. Ovary under-developed. Tumor over intestines and in mesentery
30	1+	0	0	?	3+	0	0	Abnormal but ovary well developed
31	3+	3+	2+	3+	4+	+	+	
32	2+	2+	4+	2+	3+	+	+	
33	3+	4+	+	4+	3+	+	+	
34	4+	4+	2+H	4+	—	0	—	
35	4+	4+	2+	4+	3+	+	+	
36	3+	4+	0	4+	2+	+	0	Typical ova. Advanced positive
37	4+	4+	3+	4+	3+	+	+	
38	4+	4+	4+	4+	4+	+	+	
39	2+	1+	+	1+?	+	?	0	Atypical cyst
40	4+	4+	+	4+	+	+	+	

TABLE III—Continued

BIRD	3-19-29 AGGLUT.	4-5-29 AGGLUT.	4-19-29 INTRACUT.	4-19-29 AGGLUT.	4-28-29 INTRACUT.	MAY 1929		REMARKS
						P. M.	CULT.	
41	3+	4+	3+	4+	3+	+	+	
42	4+	2+	+	3+	2+	+	+	
43	2+	2+	2+H	3+	2+	+	+	
44	4+	4+	Sl.	4+	2+	+	+	
45	4+	4+	2+	3+	3+	+	+	
46	4+	3+	4+	3+	3+	+	+	
47	4+	4+	2+H	4+	3+	+	+	
48	—	4+	2+H	4+	2+H	+	+	
49	2+	2+	3+	4+	4+	+	+	
50	4+	4+	+	4+	2+	+	+	
51	?	2+	+	3+	0	?	+	Atypical small degenerated ova
52	0	3+	+	3+	+	0	—	Ovary well developed and normal. Rest O. K.
53	—	4+	+	2+	3+	+	+	
54	0	4+	+H	4+	2+	+	+	
55	0	4+	+H	3+	+	+	+	
56	0	0	+	0	+	0	—	Organs normal. Ovary well de- veloped
57	3+	2+	2+H	4+	0	+	+	
58	0	0	2+	0	3+	0	—	Large, well developed ovary. Rest O. K.
59M	—	2+	0	3+	0	0	—	Entire bird O. K.
60M	0?	1+	+	3+	3+	?—0	0	Atypical cyst.

0 = Negative reaction.

+ = Positive reaction.

H = Hemorrhage at site of injection.

\* = *B. coli*.† = *Staphylococcus*.

Sl. = Slight.

were negative throughout the experiment (three different tests), and one negative in two trials and doubtful in the third. The postmortem examination correlated with the blood tests in every instance but two (6 and 24), in which there were slightly pathological ova, which on cultivation yielded *B. coli* and a staphylococcus, respectively, and not *Bact. pullorum*.

Of the 23 originally positive birds, two (30 and 59) which were 1+ and 2+ at the beginning, gave a negative agglutination reaction in one subsequent test, and were negative on postmortem. Of the 21 more or less consistently positive reactors, all but one (52) presented a typical postmortem picture of pullorum disease infection, and of these 21 all but two gave a positive cultural test, one of these (55) being doubtful (incomplete evidence) and the other (36) negative. One weakly positive reactor (39) throughout the experiment was doubtful in the postmortem examination and negative by the final cultural test.

The results of the wattle test are so at variance with those obtained by the agglutination and postmortem methods that a detailed discussion here is unnecessary. The most discordant reactions were obtained in the agglutination-negative group, in which twelve wattle reactions were produced of at least 2+ and 3+ intensity. In fact, only four out of the 28 that were negative throughout by the agglutination test were negative by the two wattle tests conducted on different dates. In seven instances a distinct hemorrhagic condition developed at the sight of injection.

Of the 20 birds that were consistently positive by the agglutination test and gave a positive postmortem picture, only one was negative by the intracutaneous method. Most of the positive reactions were very strongly positive, as indicated by the numerous 2+, 3+, and 4+ signs.

#### GENERAL DISCUSSION AND CONCLUSIONS

In the two experiments reported here, a high degree of correlation was obtained between the different agglutination tests made at different times on the same birds, and between the agglutination tests and the postmortem observations. The intracutaneous test gave results which very often failed to agree with those obtained by the two other methods of diagnosis. The discrepancies were most marked with the so-called negative groups, and indeed were so great in the second experiment as to render the method as applied here useless.

It may be contended that the cellular antigen employed in the second experiment was used in too concentrated form, and that the tests made with it are not representative. Such a criticism may be a just one. However, the dilutions of the antigen were made according to the manufacturer's instructions. Furthermore, the extract antigen employed in experiment I, while apparently too weak to pick out all infected birds (as indicated by the agglutination and postmortem methods), in a very large percentage (at least 25) of the tests made caused some reaction, though as a rule comparatively slight.

These observations are in accord in a general way with those of Edwards and Hull,<sup>2</sup> who found that only 47.6 per cent of the birds reacting to the agglutination test were positive by the intracutaneous method. Furthermore, that 12.8 per cent of the total number of birds tested were positive to the pullorin and negative to the agglutination tests. On the basis of the post-



mortem examinations they concluded that the large majority of these birds were not carriers of *Bact. pullorum*.

Gwatkin<sup>7</sup> states that the agglutination test proved more satisfactory than the intracutaneous (pullorin) method, when both were checked by postmortem examination. His first report was based on results obtained with 406 birds (two flocks). He recovered *Bact. pullorum* from ten out of twelve birds which reacted to the agglutination test only, and from none of the eleven that were positive by the intracutaneous method alone.

In a second investigation,<sup>8</sup> Gwatkin recovered *Bact. pullorum* from 19 out of 22 birds that were positive to the agglutination test only, and from none of the 15 that gave a reaction with pullorin alone.

Bushnell<sup>9</sup> states that of 847 birds which were tested by him by the two methods, 53 which reacted to the agglutination test were missed by the pullorin test; and that of those considered negative by the agglutination test 73 were found to be positive by the intracutaneous method. The agreement between the results of the two tests was 85.1 per cent.

The writers do not contend that as close correlations as those obtained in the present investigation between the different agglutination tests on the same birds, or between the agglutination and postmortem examination methods, will at all times be observed. Results analogous to these may be expected only in flocks where the curve of infection is for the time more or less even and on a horizontal plane.

Where new infection in the adult flock is taking place and where there is a condition which is more or less akin to the so-called "abortion storm" in herds of cattle that are infected with the Bang abortion bacillus, decided fluctuations in the serological reactions will of necessity occur, and continue to occur until the infection has stabilized itself and infected animals have become confirmed reactors. The fault of the test in such instances does not rest upon the test itself, but must be ascribed to the varying or fluctuating amounts of agglutinin present in individual animals.

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## A PRELIMINARY REPORT ON A TEST FOR SWAMP FEVER

By J. S. FULTON, *Saskatoon, Sask.*

*Veterinary Pathologist, University of Saskatchewan*

The writer feels justified in submitting the following preliminary report on a test for swamp fever because of the encouraging results obtained, in comparison with those secured from tests described as being capable of detecting infected animals.

Recently Bennett and Kenny devised a test for the detection of trypanosomiasis in camels which they find much more reliable than the formol-gel test, which had previously been used. Since the writer had tried the formol-gel test for swamp fever, with results similar to those obtained in connection with camel trypanosomiasis, it was deemed advisable to try the new mercuric chlorid test.

After much preliminary work, Bennett and Kenny found that if one drop of serum from an infected camel was mixed with 1 cc of a 1:20,000 solution of mercuric chlorid, a precipitate was formed, while serum from a healthy camel did not precipitate in such a weak dilution.

At the beginning of the work on swamp fever, it was found that serum from healthy horses, fairly regularly, will precipitate in a 1:20,000 solution of mercuric chlorid but seldom in weaker dilutions, whereas some swamp fever sera will precipitate in dilutions as high as 1:100,000.

Table I shows results of tests of sera from twenty-one horses.

### DETAILS OF ANIMALS TESTED

Horse 1 was inoculated in 1927 and has had febrile attacks since that time, the last temperature rise occurring about two months before being tested. This animal has been tested repeatedly with constant results.

Horse 2 contracted swamp fever in the field during August, 1929, and was tested on November 23 and November 28, 1929. Acute symptoms passed, the animal appeared normal but was still unable to work at time of test.

Horse 3 was a field case, symptoms developing about the middle of August and had apparently recovered on November 28, when the test was made.

Received for publication, February 8, 1930.

Horse 4 contracted swamp fever in August, 1924, and although very sick for several months recovered and is now working regularly.

Horse 6 appears twice on the chart, in the first instance as a healthy test animal and showing a negative reaction. Two weeks after the first test, he was inoculated with swamp-fever blood, typical symptoms developed and on retesting precipitation occurred in a dilution of 1:50,000.

TABLE I—Tests of 21 horses (mercuric chlorid 1 cc)

Horse	DILUTIONS						REMARKS
	1:30,000	1:40,000	1:50,000	1:60,000	1:80,000	1:100,000	
1	+++	+++	++	+	+	—	Inoculated, 1927
2	+++	++	+	#+	+		Field case
3	++	+	+	+	+		Field case
4	+	#+	+	#+	—		Swamp fever, 1924
5	+	+	—	—	—		Healthy test horse
6*	+	+	—	—	—		Healthy test horse
7	+	+	—	—	—		Healthy horse
8	+	+	—	—	—		Healthy horse
9	#+	+	+	—	—		Healthy horse
10	+	+	—	—	—		Healthy horse
11	+	—	—	—	—		Healthy test horse
12	+	+	—	—	—		Healthy horse
13	+	—	—	—	—		Healthy horse
14	+	—	—	—	—		Healthy horse
15	+	+	—	—	—		Healthy horse
16	+	+	—	—	—		Healthy horse
17	+	—	—	—	—		Healthy horse
18	+	—	—	—	—		Healthy test horse
6*	++	+	+	+	+	+	Experimental case
19	+++	++	+	+	+	+	Field case
20	+++	++	++	+	+	+	Field case
21	+++	++	++	+	+	+	Field case

\*Same horse.

+++ = Heavy precipitate in two hours.

++ = Less marked precipitate.

++ = Slight precipitate.

#+ = Marked haze.

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# TECHNIC

As mentioned by Bennett and Kenny, we find that careful technic is essential to secure results that are of value. The best

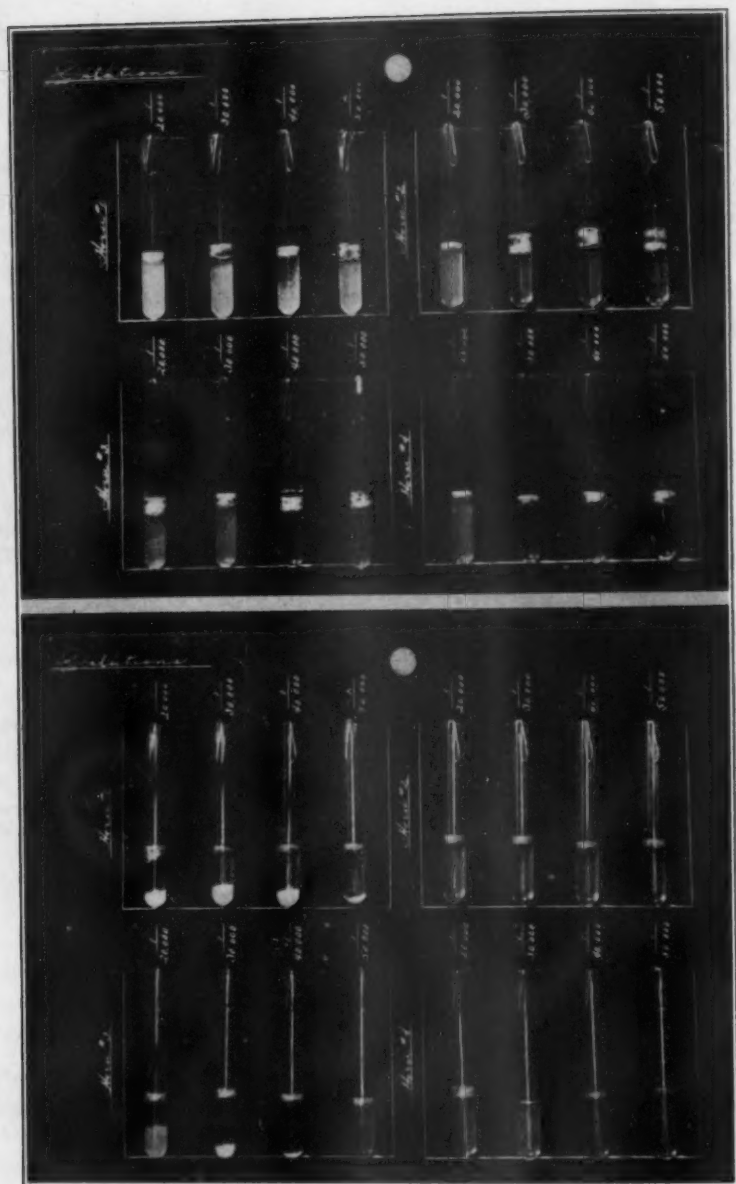


FIG. 1. (Above) Photograph taken at time of test. Horses 1 and 3, swamp fever cases; 2 and 4, healthy.  
(Below) Same as above, two hours later, when precipitate has fallen.

results are obtained if the blood is drawn and allowed to stand at room temperature until the clot is formed. The serum is then removed and kept about eighteen hours before testing. We have found that blood collected and centrifuged immediately gives results quite different from those obtained when the described technic is followed. Serum which has been allowed to remain in contact with the clot for eighteen hours precipitates in weaker solutions of mercuric chlorid than does separated serum.

In doing the test, one drop of serum should be dropped directly into the mercuric chlorid solution and the tube shaken immediately. Improper mixing results in a precipitation forming with normal sera.

It would appear from the work of Horgan and Bennett that the precipitating qualities of serum from infected camels are dependent on an increase of the euglobulin fraction which takes place chiefly at the expense of the pseudoglobulin. They find that the normal eu-: pseudoglobulin ratio altered from 0.77 to 1.6 or 1.7, but in all cases this change lagged behind the result of the mercuric chlorid test.

Work is indicated on the determination of the protein fractions of healthy and swamp-fever serum to determine if similar changes take place in swamp fever as do in camel trypanosomiasis. At the present time, horses are being inoculated experimentally to ascertain the incubation period to the mercuric chlorid test. Old swamp fever cases, which have apparently recovered, are being tested with the idea of learning how long after the initial attack a positive reaction may be maintained. Horses suffering from diseases other than swamp fever are being tested as such cases present themselves.

#### REFERENCES

- <sup>1</sup>Bennett, S. C. J., and Kenny, P. A. C.: Mercuric chlorid as a diagnostic agent for trypanosomiasis in camels. *Jour. Comp. Path. & Therap.*, xli (1928), p. 341.  
<sup>2</sup>Horgan, E. S., and Bennett, S. C. J.: Mercuric chlorid test for trypanosomiasis in camels. Mechanism of the reaction. *Jour. Comp. Path. & Therap.*, xlii (1929), p. 188.

#### Licensed to Practice

At the meeting of the Arkansas State Board of Veterinary Medical Examiners, held in Little Rock, May 6, 1930, licenses to practice in Arkansas were granted to Dr. John H. Gillmann (St. Jos. '17), of Memphis, Tenn., and Dr. C. H. Larson (Iowa '23), of Clarksville, Ark. Two applicants failed to reflect the necessary qualifications for securing a license.

***Remember the dates—  
August 26-27-28-29***



## BLACK TONGUE IN DOGS AND ITS RELATION TO PELLAGRA IN THE HUMAN\*

*By G. A. WHEELER, Surgeon*

*U. S. Public Health Service,  
Milledgeville, Ga.*

Since canine black tongue and human pellagra have been found to have a strikingly similar geographic and seasonal distribution; a strictly common cause; parallel clinical course; identical pathological changes in the tissues involved; and respond to an equal degree to exactly the same measures of treatment and prevention, the conclusion that they are one and the same condition cannot be avoided. Such being the case, a clearer and more comprehensive background for the presentation of the principal results of the work on black tongue in the dog will be supplied by first giving you a brief outline of what has been accomplished in the study of pellagra in the human.

Pellagra is a disease characterized by more or less disturbance of the digestive, cutaneous and nervous systems. The symptoms include an inflammatory condition of the mouth and tongue; disorders of the gastro-intestinal tract; general weakness; dizziness; insomnia; a distinctive dermatitis and, in many cases, a mental disturbance characterized by anxiety, confusion and fear. In this country it is largely a disease of the small or tenant cotton farmer and the smaller and more isolated rural industrial communities of the South. While it may develop at any time of the year, the vast majority of cases make their appearance during the spring and early summer months.

Pellagra prevalence is quickly and profoundly influenced by living conditions, including the many factors bearing on the availability and consumption of food of suitable variety. It is very strikingly influenced by economic conditions generally, because such conditions are reflected to no small degree in the consumption of certain lines of food. The more expensive or luxurious kinds may be enjoyed in times of plenty but must be restricted when times are hard. The foods which have been found to prevent pellagra are, as a class, of a perishable nature, usually scarce and relatively expensive. For these reasons they are not

\*Read before the fourteenth annual meeting of the Southeastern States Veterinary Medical Association, New Orleans, La., February 10, 1930.

easily procured. On the other hand, many of the staple foods of a large portion of the population of the rural sections and smaller industrial communities of the South, while comparatively cheap and usually abundant, are, as a class, known to be very poor sources of the pellagra-prevention factor. In ordinary times many of these people are in, or near, the border zone of pellagra development, particularly during the late winter and spring months, when the crops are in the making; and variety in food, as well as the family finances, are normally at a low ebb. During the late summer, fall and early winter, or the season of harvest, they are usually better off as regards abundance and variety of food. In times of general prosperity, with more money with which to buy the more expensive foods, the factor of safety may be considerably increased with a marked lowering of the incidence of the disease at all seasons, but during periods of depression with little money and strained credit, the reverse is true.

Thus, following the trend of recorded pellagra incidence in this country, we find that, though previously unrecognized, its presence was, in a way, thrust upon us by the increase resulting from the wide-spread hard times of 1907-1908. Again in 1915, when the "buy-a-bale" movement was the slogan for the relief of the cotton farmer, pellagra was one of the principal causes of death in many sections of the Cotton Belt. This was again the case in 1921, as a result of the economic stress accompanying the deflation of war-time prosperity. Looking at the other side of the picture, we find that during the years 1917 to 1920—the so-called "silk shirt period"—this country was blessed with unprecedented prosperity and an almost negligible amount of pellagra.

#### MANY THEORIES ADVANCED

In times past, many theories regarding the nature of the cause of pellagra have come and gone. Numerous disease-producing agencies, infectious and otherwise, have, at one time or another, been accused but, except for the view that diet was in some way concerned, all these theories were abandoned for lack of evidence. The food theory was the first recorded and, in one form or another, though until recently quite vague, has always held a conspicuous place in the consideration of the cause of the disease. Others have been warmly supported for brief periods, but the food theory has withstood the onslaughts of study and controversy for nearly two centuries, without having once been obscured.

Under the leadership of that able scientist, the late Joseph Goldberger, this question of the cause of pellagra has now been settled once and for all. Time will not permit of the mention of the many far-reaching and practical experiments conducted under his able direction in the clearing up of this problem. Its eradication from institutions, where it has long been highly prevalent, by means of a properly balanced diet; and its experimental production in the human, where it had never been known to develop before, by means of a restricted or unbalanced diet, in themselves constitute scientific attainment which has few, if any, equals in the history of medical science, not to mention numerous other practical tests of great value and importance. It has been proved many times over that pellagra is due to a diet low or lacking in a specific and essential dietary factor—now known as vitamin G—and may be readily cured by one rich in this substance, and no proof has been submitted that it can be produced, cured or prevented in any other manner.

Pellagra has therefore been assigned to the group of nutritional or food deficiency diseases along with scurvy, beriberi, rickets and other diseases whose origin is to be found in faulty nutrition of a specific nature, or, in order words, diseases produced by a diet low or lacking in certain essential factors known in nutrition as vitamins.

#### TRANSMISSION EXPERIMENTS FAILED

In the earlier studies conducted by Goldberger and his associates, all experiments on pellagra were conducted in the human for the reason that no other animal was known to be susceptible to the disease. Numerous attempts to transmit it to monkeys by inoculation with blood and other material from pellagra patients and, later, similar attempts to transmit it to healthy human beings, persistently failed. Early in the course of the studies which led to the proof that pellagra is due to a dietary fault, an unsuccessful effort was made to reproduce the disease in the monkey by feeding. A year later, the possibility that the dog might serve the purpose of an experiment animal was suggested by Chittenden's book, "The Nutrition of Man," published in 1907, in which the results of some feeding experiments in the dog were described. It had been observed that a dog, transferred from a diet in which meat and milk were conspicuous elements, to one in which these items of food were wholly lacking, was very liable to show disturbing symptoms, even though the chemical

and energy values of the diet were kept up by increasing the quantity of the other foods. The disturbing symptoms produced were described as "loss of appetite; inflamed and sore mucous membrane of the mouth; marked gastro-intestinal upset with bloody discharges; loss of weight and a general state of wretchedness." When the meat or milk was restored to the diet, the animal would at once begin to recover and would soon be restored to health.

To those of us from the South who were associated with Goldberger in his pellagra studies, the description of this experimental condition appeared to bear a striking similarity to the condition fairly common among southern dogs and known as "black tongue." The "gastro-intestinal disturbance with inflammation of the mucous membrane of the mouth" was also strongly suggestive of pellagra. This was all the more impressive since, in the dog, a high degree of preventive and curative action was attributed to meat and milk, for at that time considerable evidence of the relation of diet to pellagra, more especially the value of meat and milk in its treatment and prevention, had already been accumulated.

#### WORK OF CHITTENDEN AND UNDERHILL

In 1917, Chittenden and Underhill, of Yale University, published a report of the production in dogs of a pathological condition, in many respects similar to those just described, by feeding a diet of boiled peas, cracker meal and cottonseed oil. The salient features of their description of the condition produced is as follows:

Usually the first abnormal manifestation is a refusal to eat and examination reveals nothing to account for the loss of appetite. The animal lies quietly in its pen and is apathetic. After refusal to eat for a day or two, the mouth of the dog will present a peculiar and characteristic appearance. The inner surface of the cheeks and lips and the edges of the tongue are so covered with pustules as to give the impression of a mass of rotten flesh. The odor from these tissues is foul and almost unbearable. When stroked with absorbent cotton the mucous lining of the mouth comes away in shreds. Intense salivation and a bloody diarrhea are present, attempts at defecation being very frequent and resulting in the passage of little more than a bloody fluid of foul odor. Death usually results without any particularly striking features.

This report, coupled with Chittenden's earlier observations, was so suggestive that we at once began to look into the subject of black tongue, as it occurs under natural conditions, and its possible relationship to the condition in the human. Through the courtesy and cooperation of the veterinary medical profession of the South, we were enabled to observe many cases of the disease,

including postmortem studies, all of which pointed very strikingly toward the almost certainty that the experimental condition produced by Chittenden by feeding bread and lard, and by others by feeding boiled peas, cracker meal and cottonseed oil was, in reality, nothing more nor less than the disease of dogs known as black tongue. A comparison of the clinical course, seasonal and geographic distribution and associated diets of black tongue in dogs with that of pellagra in the human rendered the probability no less striking that these also are one and the same. Other observers, including Spencer, of Concord, North Carolina; Saunders, of Waco, Texas, and Cary, of Auburn, Alabama, had, independently, reached a similar conclusion. However, this view, while amply supported by circumstantial evidence, was considered as merely a working hypothesis and called for scientific proof.

#### DISEASE REPRODUCED EXPERIMENTALLY

At this point our efforts to reproduce and study this condition in the dog, by feeding known pellagra-producing diets, took definite form. The first diet studied successfully was composed of hominy grits, wheat farina, white rice, cowpeas, lard, gelatin, cod-liver oil, tomato juice, sodium chlorid and calcium carbonate, in such proportions as to meet fully all the known physiological requirements. Food materials of the best grade were used and each dog was allowed all he would eat. They were kept under the best possible hygienic and sanitary surroundings. Five healthy young dogs were used, all of which in due time (varying from 51 to 73 days) came down with the disease. Four of the five died; one recovered under treatment with finely ground fresh beef used as a supplement to the test diet. All five of the test animals developed a condition which had the same outstanding clinical features. A general idea of the way it happened will be furnished by presenting the salient points in the clinical record and postmortem findings of dog 1:

*January 16:* In good condition; weighs 11.1 kilograms; begins test diet.

*March 8:* Food consumption markedly reduced during the past four or five days. There is present today a noticeable excess of saliva. The mucosa of the gums of the lower jaw and of the adjacent portion of the floor of the mouth shows irregular patches of congestion.

*March 10:* Ate all food yesterday. The salivation and the reddening of the buccal mucosa have subsided.

*March 30:* There is present this morning a reddening of the mucosa of the upper lip and of the gums in the region of the oral commissures. The skin of the scrotum appears dry and some flaky desquamation is present. Weight, 10.2 kilograms. Temperature at 10 a. m., 38.6° C. The



food consumption record of this dog shows that his appetite has oscillated considerably from day to day since March 14.

*April 2:* The eyes are watery. There is a slight congestion of the mucosa of the anterior portion of the floor of the mouth and of the cheeks. Slight buccal odor. Condition of scrotum unchanged. Weight, 9.8 kilograms. Temperature at noon, 38.1° C.

*April 4:* Scrotal lesions appear unchanged. At about the level of the line of occlusion of the teeth the mucosa of each cheek presents a brownish streak about three or four millimeters wide. This appears to represent an area of superficial necrosis. The mucosae of the base of the tongue, of the soft palate and of the fauces appear somewhat similarly affected. Buccal odor is quite fetid. Temperature at 10 a. m., 38° C.

*April 7:* This morning the reddening of the buccal mucosa appears more pronounced than yesterday. The necrotic areas continue present. There is a moderate increase of saliva. Buccal odor continues fetid. Temperature, 10 a. m., 38.8° C.

*April 10:* The previously noted reddened patches on the mucosa of the upper lip have developed into a sharply delimited band on each side, extending from about the region of the canine teeth back to the cheeks, where they merge in the reddened and necrotic lesions of the buccal mucosa. There is drooling and pronounced odor. The skin of the scrotum appears more reddened and desquamation continues. A large partly formed bowel evacuation during the day. Temperature, 10:30 a. m., 39.1° C.; at 4:30 p. m., 39.8° C.

*April 11:* The inflammation of the mouth now includes the margin of the tongue. There is moderate drooling; odor foul. Passed soft, blood-stained stool. Temperature, 9:30 a. m., 40° C.; at 4:30 p. m., 40.7° C.

*April 12:* Has a weakened, dejected appearance this morning. Passed a diarrheal, blood-stained stool during the night, with which he is extensively soiled. Buccal mucosa more severely inflamed and necrotic. Marked oral fetor and drooling are present. The scrotum shows a pronounced erythematous fringe along the anterior and lateral borders of the desquamating area. The posterior limit of this area is obscured by black pigmentation. There is increased drooling and there have been several diarrheal evacuations during the afternoon. Has eaten nothing since April 9. Temperature at 10 a. m., 40.7° C.; at 4 p. m., 40.9° C.

*April 13:* Found dead this morning.

#### AUTOPSY FINDINGS

Skin of scrotum is dry, red and scaly. The anterior and lateral limits of the affected scrotal area are well defined; the posterior limit is obscured by dark, normal pigmentation.

The entire buccal mucosa, except that of the anterior portion of the tongue and hard palate, appears, on inspection, to be inflamed and necrotic. The same process involves the mucosae of the pharynx, nasopharynx, larynx, including the glottis and epiglottis, and of about the upper two inches of the esophagus. The necrosis seems to be more marked on the mucosa of the cheeks, the base of the tongue, and the soft palate.

The mucosa of the stomach is markedly congested, with submucous hemorrhages over a rather large area about the pylorus and along the greater curvature.

The small intestine contains a small amount of bile-stained mucus. Scattered throughout the upper half of this gut there are

seen small submucous hemorrhages. These coalesce here and there to form small hemorrhagic patches.

The colon contains a small amount of yellowish, slimy mucus. The mucosa is congested and presents numerous submucous hemorrhages. The cecum is similarly affected, but to a lesser degree.

The rectum is empty and is markedly congested with numerous submucous hemorrhages throughout its length. The portion just within the anus presents what appears to be the same process as that seen in the buccal cavity.

All five of these test animals, when sick or at postmortem, or both, were also seen by several prominent veterinarians, including Doctors Leigh T. Giltner and Jacob E. Shillinger, of the Bureau of Animal Industry of the United States Department of Agriculture, and Dr. M. R. Blackstock, of Spartanburg, South Carolina. All agreed with us that the condition presented was indistinguishable from that occurring spontaneously in dogs and known to American veterinarians as black tongue.

Aside from a few variations of a minor nature, the foregoing description is representative of our findings in all subsequent cases and under the use of a large assortment of foods. With some diets the time required to develop the condition is considerably shortened while with others it is prolonged. This has been found to vary directly with the amount of the protective vitamin each diet supplies. A diet low in the protective factor not only causes the symptoms to appear more quickly but, as a rule, they are more acute and more marked and, unless protection is promptly supplied, more quickly fatal.

#### SCROTAL LESIONS CHARACTERISTIC

The scrotal lesions presented in our experimental cases had not been generally observed in the spontaneous disease, probably for the reason that, under ordinary conditions, the inspection of this part is uncalled for and, as a rule, is not done. The same thing was true of our experimental cases of pellagra produced at the Mississippi State Penitentiary. All of these showed the initial skin lesions on the scrotum, though several later developed them elsewhere. Prior to the report of this study, lesions on the scrotum, though they had been observed, were believed to be very rare. In our experimental work on black tongue about 40 to 50 per cent of the attacks in male dogs have shown typical scrotal skin lesions, in all respects similar to the dermatitis in the

human. They appear with the other symptoms and, when a cure is brought about, disappear with them. This change is regarded, therefore, as strictly analogous to the skin changes in the human disease, which, when the similarity of the other clinical features of black tongue and pellagra are taken into consideration, goes a long way towards the establishment of their identity, not to mention their common epidemiology, histopathology, cause, treatment and prevention.

The work in the dog has since been carried on along lines parallel to and coordinated with those followed in the experimental studies of the disease in the human. Up to the present time, several hundred separate and distinct attacks of black tongue have been produced, to say nothing of the large amount of work with foods of a preventive nature. Such a statement may sound extravagant but it is a fact that in the laboratory exactly 100 per cent of any desired number of normal dogs can be made to come down with black tongue at will by diet alone, and if not allowed to go too far, the same percentage of the sick dogs can be completely cured by a suitable diet.

#### EXPERIMENTAL BLACK TONGUE

A brief general description of the experimental disease, as we have observed it, is about as follows: After a variable period, during which the dog's appetite may have been consistently good or may have varied irregularly, examination of the mouth reveals a more or less extensive reddening of the lining of the upper lip, or of the cheeks, or the floor of the mouth, or all three. The initial reddening of the mouth may fade completely after a brief period, to reappear after a variable interval. It may appear at first as a single patch, or a row of patches on one or both sides, or as an elongated red streak or band. When fully developed, this band may extend on each side from the median line in front back to the reddened mucosa of the cheek, with which it merges. The flushing of the cheeks and the floor of the mouth may be streaky at first, but later becomes diffuse. The tongue is ordinarily but slightly affected until the attack is well advanced. There then develops a reddening of the lateral margins just back of the tip or at the indentations made by the lateral teeth.

Sooner or later, frequently within 24 hours after the appearance of the lip lesion or of the reddening of the mucosa of the cheeks or of the floor of the mouth, irregular patches of superficial necrosis develop here and there within the reddened areas. These

necrotic patches may appear as a brownish or grayish tint. The necrotic process may affect also the mucosa of the base of the tongue, the soft palate, the fauces and the gums. At times the margin of the tongue, especially where indented by the teeth, becomes affected by a severe necrotic process and may take on a dark-blue tint. Exceptionally the entire free portion of the tongue takes on this color.

As the stomatitis progresses, a fetid odor and an increase in buccal secretion develop. With the advance of the stomatitis the odor becomes more and more foul, frequently becoming extremely so. The salivation may show itself at first only as a slight excess of moisture on the lips; later there is drooling, frequently of a stringy secretion, occasionally blood-stained, which may hang from the corners of the mouth.

As the attack progresses the bowel evacuations generally become small and dry, which may persist to the end; but is often succeeded by diarrhea with small, brown, liquid and, at times, bloody evacuations.

#### TEMPERATURE REACTIONS

The temperature at first continues at its normal level ( $38^{\circ}$  to  $39^{\circ}$  C.); later it rises and within 24 to 48 hours reaches a point somewhere between  $40^{\circ}$  and  $41^{\circ}$  C. As a rule it remains up until the end approaches, when almost invariably it declines rapidly and continuously to the end. We have come to regard the rise in temperature as a very grave sign. The chances of saving the life of the animal by treatment rapidly diminish the longer it is delayed after the rise in temperature has taken place.

The behavior of the animal in the early stages presents little or nothing to suggest that it is sick. Toward the close, however, it becomes less active and appears more and more apathetic. As the animal's food intake diminishes, its weight declines. If the course of the attack is acute or rapid and the animal dies within a week or ten days, there is little or no emaciation; but, if the progress of the attack is of a prolonged, intermittent, or relapsing character, emaciation may become extreme.

In our work we have commonly used our animals repeatedly, so that many have had a number of more or less marked successive attacks. As far as we are able to judge, one attack confers no appreciable increase in resistance to another, nor does it diminish the resistance to a subsequent attack, provided the animal is

adequately reconditioned by proper feeding. Susceptibility to attack does not seem to be influenced by either age or sex.

The response to proper treatment, when this is not too long deferred, is commonly prompt and striking. The temperature, if it has already risen, declines to normal; the redness of the mouth rapidly subsides; the necrotic areas clean up, leaving healthy, superficial ulcerations which heal rapidly; the animal begins to eat, and within a week or ten days little may be left of the severe pathological process present when treatment was begun.

Black tongue and pellagra have been found to respond alike and to the same degree to all foods tested. If a given diet protects against pellagra in the human, it also and invariably protects against black tongue in the dog, and vice versa. Several of the long list of staple foods and foodstuffs habitually used by the human, and incidentally by the dog, have been tested for their preventive value in black tongue and pellagra. The work is being continued and it is hoped that the entire list may eventually come under study and be classified in this respect. It has been found that milk (including buttermilk), fresh lean meats, liver, dried yeast, canned salmon, and wheat germ are highly effective as preventives of both black tongue and pellagra. Dry skim-milk, tomato-juice, cowpeas, English peas, eggs, canned haddock and whole wheat products furnish somewhat less, but appreciable protection; soy beans, carrots, and rutabaga turnips furnish very little; and corn products, molasses or sugar, butter, cod-liver oil, cottonseed oil, salt pork, pork fat, sweet potatoes and onions are practically without detectable value as protection against either disease.

#### YEAST IS BEST THERAPEUTIC AGENT

The treatment of the condition is implied in what has been said regarding its cause and prevention. All foods showing preventive value will also exert a favorable therapeutic effect, but a somewhat larger proportion and in a state easier to assimilate, may be required for curative purposes. The most successful and satisfactory single agent in the treatment of the disease is pure dried yeast. A dosage of fifteen to thirty grams ( $\frac{1}{2}$  to 1 ounce) daily, depending upon the weight of the animal and the severity of the attack, has been found highly satisfactory in both black tongue and pellagra. However, since they are both the result of faulty nutrition, the sooner the diet can be corrected, the better. Local treatment is often indicated but not essential.



There is in every well-established case of black tongue more or less local infection of a secondary nature superimposed upon the mouth lesions. This, in general practice, requires more or less local cleansing and antiseptic treatment, for the comfort of the animal as well as to promote healing. However, we have never been called upon to resort to any measures other than proper feeding, or feeding supplemented by dried yeast, for prompt and complete recovery.

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### Pharmacologist Wins Ebert Award

Marvin R. Thompson, assistant pharmacologist of the Food and Drug Administration, U. S. Department of Agriculture, has been awarded the Ebert medal by the American Pharmaceutical Association. The prize goes to the author who, at the annual meeting of the Association, presents the paper "contributing most to the science of pharmacy." Mr. Thompson, who is 24 years old, is the youngest man ever to receive the Ebert award.

Albert E. Ebert, who was a noted educator and research worker in the field of pharmacy, many years ago endowed the prize as an annual reward for meritorious work in pharmacy. Mr. Thompson's winning paper was one of 85 presented before the Association last year. His subject was "The Pharmacology of Ergot" and he reported work he did in the standardization of ergot for strength, quality and purity, in connection with the regulatory work of the Food and Drug Administration.



"Courtesy Union Pacific System"

The Three Brothers, Zion National Park

## SOME PROBLEMS IN VETERINARY EDUCATION IN THE UNITED STATES\*

By O. V. BRUMLEY, *Columbus, Ohio*

*Dean, College of Veterinary Medicine, Ohio State University*

The development of any great industry often brings into being contributory agencies that eventually become essential for its existence. This is true of animal husbandry of America. It had thrived for many years on the virgin soil of a new continent without excessive losses from disease or epizootics. A time came, however, when the demands of the growing industry called for improvement in breeding stock. To satisfy the needs, purebred animals were brought from Europe, where centuries of continuous occupancy of the soil had enabled many acute and chronic infections to develop. With the importation of the better animals, diseases came also. Their causes were unknown, and their appearance on the new continent was the occasion of alarm, for they spread rapidly and threatened the growing live stock industry of America.

At that critical time in the development of this vast industry in American agriculture, a great change took place in the field of higher education. The exclusive right of the classics to dominate the curricula of the colleges and universities in this country was challenged. It was in 1850 that the legislature of Michigan asked Congress for a grant of 350,000 acres of land for the establishment and maintenance of agricultural schools within the State. Congress at that time took no action upon the petition.

During the next few years the general interest in the subject increased. At every session of Congress memorials, resolutions and petitions were received from individuals, from boards of agriculture, from farmers' conventions, and from state legislatures, asking for the national endowment of agricultural schools in each of the states. For several years these memorials received no attention, and there was an evident disinclination, even on the part of those members of the national legislature who were friendly to the project, to urge its consideration. The reason for this is not far to seek. Bills had been introduced of a like char-

\*Presented at the eleventh annual University of Illinois Veterinary Conference, Urbana, February 10-12, 1930.

acter for various and sundry projects which had been promptly vetoed by the various presidents.

However, the friends of higher education for agriculture were not to be denied and in the first session after James Buchanan became president, a bill was introduced in the House of Representatives to grant to each state in the Union, for the maintenance of agricultural schools, a quantity of land equal to twenty thousand acres for each senator and representative in Congress to which the state was entitled. In any state where there were public lands, the lands granted to that state were to be selected therefrom; to every state in which the public lands did not equal the proposed grant, land script was to be issued to make up the deficiency. The members of the committee to whom the bill was referred did not agree in their opinions. It was held at this time that the bill was unwise and unconstitutional, and that "without a promise of pecuniary compensation Congress has no power to grant portions of the public domain; and if it had, no policy could be more unwise than to grant it for the support of local institutions within the State." This bill, however, with slight amendments passed Congress in 1859. President Buchanan vetoed the bill, basing his veto on the arguments that it was unconstitutional.

#### A TRIBUTE TO LINCOLN

The friends of agriculture, still not to be denied, introduced the bill in Congress again in 1862. At this time little opposition was offered except that the Civil War was raging and arguments of economy were proposed. However, the bill was passed by both houses of Congress. The bill, therefore, giving aid particularly to higher education in agriculture, mechanic arts and military science, was signed by Abraham Lincoln, in 1862. It is a great pleasure, therefore, on this day, to pay special tribute to the great Emancipator who in his great wisdom made possible the development of these types of higher education in the United States. Perhaps he had an intuition of the far-reaching effect this act would have in developing these great industries for future generations. It was the foundation stone for the real *development* of agriculture and veterinary science.

A few educators saw the need for research and the application of its findings in agriculture and veterinary medicine. As a result of this act, and other grants of money by the government, there were established in the various states many departments

relating to these sciences and strong impetus given to their development.

We should recall that prior to the establishment of the state veterinary colleges and veterinary departments in agricultural colleges, there were established in this country several private institutions which flourished and contributed greatly to veterinary education. These private institutions were the pioneers in veterinary education and influence, and made a wonderful contribution to the conservation of the live stock industry. They laid the foundation on which these other institutions must build and perpetuate the principles and high standards for which most of them held forth. Much of the early work of the pioneers in veterinary education consisted of the practical application of the *then* known principles of veterinary medicine and surgery to the treatment of individual animals. There was little attempt made to consider preventive medicine, but after the outbreak of certain contagious diseases which threatened to destroy the live stock industry of our country, then it became apparent that other phases of veterinary science must be considered and developed to cope with the situation.

The establishment of the land grant colleges and their support by congressional action contributed greatly in equipping such institutions for the purpose of developing these newer phases of veterinary science. Many of these institutions have contributed valuable information, which is very difficult indeed to evaluate, in making it possible to perpetuate and develop the live stock industry and maintain it on a successful basis.

All of this development, naturally, has come about by the most difficult methods and under very trying conditions.

#### ADEQUATE VETERINARY SERVICE NECESSARY

Today the ever-increasing importance of veterinary medicine has become recognized by all thinking people. For a time it was believed that since the motor car had arrived, displacing thousands of horses used for transportation, veterinary medicine would no longer be an important service to mankind. Experience in the past few years has shown that the opposite is true. The need for more adequate veterinary service is today much greater than it ever was. The changes in our civilization, especially since the great war, have created a greater demand for the veterinarian than ever before. New lines of veterinary service have opened up in which the entire field has broadened beyond what

was ever thought possible by the older men in the veterinary service. However, the future will require a higher type of veterinary service in order that our live stock industry will be saved from the ever-increasing new problems of diseases that will constantly threaten its ruin. This total industry, as we all know, is enormous.

On the farms of our country there are over 58,000,000 cattle, 42,000,000 sheep, 53,000,000 swine, 20,000,000 horses and mules, and over 500,000,000 domestic birds. All these animals represent an investment of approximately seven billions of dollars. These animals are, on the average, of a much better type and, therefore, more valuable individually than formerly. It has been definitely shown, and it is generally recognized, that the live stock producer cannot afford to keep mediocre or inferior live stock. With higher labor cost, increased taxes, and higher living rate, only the most efficient animals can be maintained at a profit. While individual farm animals are now of greater value than they used to be, their production is more hazardous.

#### NEW PROBLEMS ARISE

As our country grows older, the soil is becoming depleted in some of its elements and polluted with various disease-producing agencies, while plants contain in many instances a low mineral and vitamin content, all of which favor the development and spread of diseases, especially those of a communicable nature. Modern communication and transportation facilities are contributing greatly toward the spread of diseases, especially infectious and contagious diseases. Each year, therefore, the live stock producer finds his animals increasingly menaced, which is requiring him to spend a greater share of his time and energy in preventing the development of diseases in his herds and flocks. To meet this situation there must be produced a constant and an increased supply of educated, trained and experienced men.

Already our live stock losses aggregate nearly \$300,000,000 annually. Most of the diseases producing this enormous loss are preventable. Then, after knowing these facts, what is the solution? Naturally we must extend our educational facilities to meet this growing problem.

Veterinary medicine in our opinion in this country is yet in its infancy and will require the combined efforts of the present and future generations of veterinarians and scientists to give it the proper status in order for it to occupy its proper place along



with the other professions and to render the service demanded of it.

The only source of supply of veterinary service is through the colleges and universities of our country. None of our colleges at the present time are adequately staffed, housed, or equipped to meet the future task ahead of us. A veterinarian, like the physician, is a necessity growing in pace with the progress of modern civilization. This demand has produced a certain amount of development, but it is growing more rapidly than the profession is able to meet it, unless our educational facilities can be rather rapidly augmented.

The statement has been made that there are not a sufficient number of well-trained and educated teachers of veterinary medicine in this country to extend our college training to any great extent. We believe this is true and consequently this situation is one of the first that should be solved.

It is also the duty of the veterinary colleges and departments of veterinary science in colleges of agriculture to assist the federal departments and endowed educational institutions to bring about a higher standard of veterinary education in this country.

#### HUMAN MEDICINE AND VETERINARY MEDICINE GETTING CLOSER TOGETHER

It is noted with a great deal of pleasure and enthusiasm the affiliation that is taking place between medicine and veterinary medicine. The combined meetings that have been held, such as the one during this conference and elsewhere, have brought into immediate contact representatives of both professions and this will go a long way towards building up a proper cooperative spirit and a clearer understanding of each other's duties and responsibilities. It is being recognized that these two professions have much in common in bringing about a clearer conception of public health work and the necessity of teaming together to solve the many problems of disease control. This is a distinct educational program and we hope that it will continue until there is perfect harmony and accord in all matters relating to both professions. Combining the efforts of these two professions will do much to solve some of the educational questions that confront us today. We should lend our efforts in every way possible to assist in bringing about a better understanding, and ways and means of assisting each other in carrying on the high purpose of each profession.

What are some of the real problems in veterinary education at this time?

#### ORGANIZATION OF FACILITIES FOR VETERINARY EDUCATION

This is the age of centralization in business and in industry. Why not in these special lines of education? Centralization of these various educational facilities will avoid duplication of effort, will combine the abilities of those engaged in the work so that a much greater degree of efficiency will result. Many of the states have several departments in which various types of veterinary educational work is carried on. We do not object to the fact that the various departments are interested in this work but certainly it could be much more efficiently conducted and the results far greater if they are combined under one administrative program. In our own state we found three institutions carrying on educational work in veterinary medicine. It is true the work is partly academic and partly research but, after all, educational. All educational institutions, which are usually classified as academic, are naturally interested in productive scholarship as well. The two should be combined. Academic work loses its emphasis and value without the research element.

As a result of this situation in our state, we conceived the idea of a cooperative program which would combine all of these activities into an amalgamated group. This program has been successfully completed and at the present time is in operation. Although it has been in operation only a few months, much progress has been made and an enlarged program projected. It has given an opportunity for the various groups interested to hold seminar meetings, discuss their research and academic problems, and project new questions for solution. This can result in only one thing—a much more efficient service from a professional and academic point of view, which will eventually benefit the live stock industry through the veterinary profession. This, in my opinion, is the *only source* through which the live stock industry can receive efficient and accurate assistance.

Decentralization of the veterinary educational resources always tends to demoralize the service, brings about a duplication of effort, and can lead only to a loss in its value to the live stock industry. There are many examples of this situation not only in veterinary educational work but in many other lines of endeavor. The old saying, "In union there is strength," is just as true in our educational work as in business, social, or governmental affairs.

The first real problem in veterinary education, therefore, is to organize all of our available facilities for a more efficient and far-reaching program for research and academic training.

In organizing these various agencies it might be for the purpose only of research work, or it might be for both, but in any event it will culminate in an improved service and redound to the credit of the veterinary profession and render a real service to the live stock industry and humanity in general.

We must remember that in this program of combining these agencies it will serve to bring us in closer contact with other professions, extend the service of the veterinary profession and open up new fields and opportunities. Many of us can recall without any difficulty the great change that has taken place in the service of the veterinary profession during the past decade. None of us can predict just what our duties and responsibilities will be at the close of another decade. There is one thing quite sure, if we marshal our forces, combine our facilities, and take seriously this educative process, we will be in position to meet any and all emergencies that may arise.

#### EDUCATION OF UNDERGRADUATE STUDENTS

Education has been defined as "the acquisition of the art of utilization of knowledge." It is not the mere acquisition of knowledge as tested by examinations. It is possible to pump into the minds of a certain class a certain quantity of inert knowledge by means of lectures and text-books. This may be specialist education but it is not education, which, to be successful, cannot be divorced from general culture. Any system of education should aim to produce men who possess both culture and expert knowledge in some special direction. Something more than vocational training must be included in the equipment of a member of a dignified profession. A person may be educated and not trained, or trained and not educated. It has been said, "when there was less to know it was more possible to remain unconscious of ignorance." The scope of our knowledge has widened. The standard of general education required of a veterinary student is higher than what it was a few years back and this standard should be increased as rapidly as possible.

Medicine has reached an enviable position in which it can require definite college training for entrance to the colleges. This situation must come about in veterinary education in the near future, if we expect to maintain our position with our sister

professions. Some believe the time is not far distant when the entrance requirements to our veterinary colleges will be raised to at least two years of a pre-veterinary course, or the course extended to five or six years. We are all looking forward to that time with a great deal of anticipation and pleasure.

You may ask why the veterinary colleges do not arbitrarily raise their entrance requirements. There are several very excellent reasons why this has not been done. The number of veterinary students in the colleges at the present time is too small to warrant any reduction. The number of graduates from all the veterinary colleges in the country is not sufficient to replace one-half of those leaving the profession through death, retirement and other reasons. This in our opinion is a serious matter and unless the number of veterinarians can be maintained, the live stock industry of the country is bound to suffer. It will permit other agencies to flourish which will be a decided blow to professional activities and turn the pages of history back a number of years. This we cannot afford to do. We must go forward.

There appears on the horizon a specter of hope in that the number of veterinary students matriculating has gradually increased, although slowly, during the past few years. We are in favor of raising the standards for the matriculants just as soon as conditions will permit it to be done. Too many of our universities are inclined to think too seriously of mass education rather than to encourage a higher standard of scholarship for a small group. Consequently proper buildings, equipment and sufficient personnel for instruction suffers.

Therefore, the second real problem in veterinary education is to bring about conditions conducive to a higher standard of scholarship for students matriculating in the colleges; and to equip the institutions giving the instruction with personnel, buildings and material things so that the academic standards can be carried through on a basis equal to that of the other professions. We do not feel pessimistic about this whole question, because we are convinced that it is only a question of time until this change will be wrought. The value of the veterinary profession in the whole scheme of human affairs is so vital that it must go on and reach the heights maintained by the other professions. Our profession can do much to hasten the dawn of a new day in the history of veterinary education.

### EDUCATION OF THE MEMBERS OF THE PROFESSION

There should be a larger number of graduate students enrolled in the graduate schools of our universities, taking work in some phase of veterinary medicine. Certain questions have arisen in several of our universities in regard to the acceptance of graduate students from veterinary colleges. The time is not far distant when this whole question will be solved satisfactorily because graduates of our colleges will be able to carry on graduate work with credit to themselves and the various institutions. Any misunderstandings in this connection will be clarified when a sufficient number of graduate students receive their degrees and make places for themselves in the educational field. The field of activities for the graduate veterinarian has increased very rapidly during the past several years. The number of well-trained veterinarians is insufficient to meet the demands for many of these new-formed positions. There should be a sufficient number of graduate students going out each year from the various colleges to meet this situation. The profession as a whole suffers because these positions cannot be filled.

It is a well-known fact that it is difficult to find adequately trained teachers to add to the personnel of our colleges. We need more graduates of the right type to obtain special education and training for this work. There should be more ample provision made, for those already on the college faculties, to devote at least a portion of their time for productive scholarship. Experience has shown that there is so much routine work and limited personnel that little time can be utilized by the individual for this purpose.

### VETERINARY CONFERENCES

Many conferences are given expressly for the purpose of imparting information to the members of the profession by the various state institutions. This is in accord with our idea of assisting in this educative program. Perhaps an insufficient number of our graduate veterinarians have taken advantage of this splendid opportunity to obtain in a short time many facts of vital importance to them in their routine work. These short courses should be in such demand by the profession that it would be necessary to hold sectional meetings in various parts of the state to accommodate the large number wishing to attend. A splendid opportunity to obtain the latest information on the



various phases of veterinary medicine is lost by many members of our profession.

Every board of health in every community and municipality in our country should have at least one veterinarian on it. Think of the many questions that are constantly coming up for solution. Every man, woman and child in the country is concerned about pure foods. At the present moment the question of undulant fever, which has received a great deal of publicity lately, should have careful consideration lest it bring much distress and economic losses to the citizenship of our country through non-use of dairy products.

The veterinarian should educate himself to participate in such public activities and thereby render most valuable service to his clientele and the general public. The veterinarian has much responsibility in this respect in regard to the health of the entire community. Let us look into this situation, make a study of it in your community, and we feel sure you will agree with us that your services are needed to assist in protecting the health of the public as well as the live stock industry.

The reading of current periodicals will assist greatly in this self-educative process. There are a number of these periodicals, in most any language you may desire to read, which, if read continuously, will keep the veterinarian in contact with the latest developments in veterinary medicine. Books are naturally a distinct asset and should not be overlooked.

These are only a few illustrations of what might be done in educating the members of our profession. We cannot expect the public to take us very seriously unless we take this question—self-preparation for our work—in a serious manner.

This problem in veterinary education might seem rather easy to solve but when we think of the many individuals it involves and the insurmountable difficulties in reaching these individuals, it assumes a real problem. However, this whole question must be solved by the individuals in the profession. The profession will rise or fall depending upon how seriously we take this important responsibility.

#### EDUCATION OF THE LAITY

It will be readily conceded that the veterinary profession exists for the purpose of conserving animal life, the interests of the owner, public and, of course, the wealth of the state. Our work is of great importance. We sometimes wonder whether

this fact is well enough understood by the laity in general. Many forces have been operating trying to minimize the real value of the veterinarian and his profession. Too much reliance and emphasis has been placed on the application of remedies and principles without taking into consideration the fundamental or underlying facts, that is, the diagnosis of the case. It is difficult enough for the trained veterinarian to apply rational principles of treatment in his daily practice but how much more difficult it is for the untrained to arrive at the correct therapeutic principles. It cannot be done. The custom of too many owners of animals is to call upon our services when the individual animal is seriously ill and beyond what he considers his skill, or when grave losses have already occurred in his herds and flocks. This situation, fortunately, does not exist in all communities and perhaps the day will soon dawn when the veterinary profession will be given an opportunity to exert its full value and skill in this conservation program.

This in our opinion is largely a matter of education which is the fundamental law in all fields of endeavor. Owners of live stock and those in close contact with them will eventually realize that it is unsound economically to rely on unscientific and empirical methods in the prevention and control of diseases affecting the live stock industry. Just as soon as these economic principles make a thorough and lasting impression on live stock owners and others, then this situation will be a long way towards solution.

#### PREVENTIVE MEDICINE GAINING GROUND

Preventive medicine is gaining a strong foot-hold in all countries and has come about through a better understanding of the importance of these underlying principles. From an economic point of view, naturally, preventive medicine is sound in principle and its value to the public and the live stock industry should be stressed more than ever before.

In the education of the laity to the real significance and importance of the veterinary profession there are many problems to be solved. In the first place our educational institutions can render a great service by assisting in keeping the public informed of the need and importance of veterinary service. It also can assist materially in directing veterinary service into its proper channels. In some cases attempts have been made to direct this information through other channels, which has given a false sense of security to the live stock owners and disastrous results

to the live stock industry from an economic point of view. It would seem logical to employ those best fitted to cope with these serious problems which mean so much to the future development and prosperity of the live stock industry in this country.

We realize that through the advent of the many new educational facilities the public is rapidly becoming enlightened on many questions that were formerly mysteries. This in itself will have an important bearing on this question. The standards of education in general are being raised through the high schools and the ever-increasing numbers that are attending the various universities and colleges. This should assist materially in the years to come, in solving this question provided those in authority will give considerable thought and attention in properly evaluating the services of the veterinary profession.

The members of the profession itself are very potent factors in bringing about a better understanding between these various elements by taking advantage of all opportunities for self-advancement; by rendering prompt and efficient service at all times; by taking part in community affairs; by stimulating interest in all live stock matters and in many other ways assisting in the great movement towards the building up of a happy prosperous citizenship. This question of education of the laity will be solved eventually. So let us begin at once to think of the various ways and means by which we individually can assist with this program.

#### CONTINUITY IN VETERINARY SERVICE

There should be harmonious action between the various branches of the veterinary profession. Those engaged in the various lines of veterinary activity should so shape their work that it will conform to the service rendered by other groups. It seems to me that inasmuch as we are all interested in the welfare of the profession as a unit, we should unselfishly devote a part of our time and energy toward building it up. Especially, we should avoid lending our time and attention to the formation of factions, belittling our competitors, and in many other ways which ultimately tend to demoralize our standards and service. We have mentioned previously the word centralization regarding facilities for education. It would be equally applicable when applied to these principles. Let us centralize our thoughts, our ambitions and activities in coordinating our efforts towards a better and

higher standard of service and for a more dignified professional career.

There is a new era approaching in veterinary medicine. Conditions generally have shown much improvement during the past few years and we sincerely believe that in the near future many of the seemingly insurmountable problems in veterinary education will reach a solution. When this occurs the profession will develop more rapidly and reach a position commensurate with the other professions.

### Places of Interest To Be Seen At

- A mbassador Hotel (A. V. M. A. Convention Headquarters).
- V eterinary Hospitals (Most Modern Dog and Cat Hospitals).
- M otion Picture Studios and Theatres, Missions, Museums, Monkey Farm, Mountains.
- A utomobile Assembly Plants, Amphitheatres, Amusement Places, Arabian Horse Farm.
- L ion Farm (only one of its kind), Live Stock Ranches.
- O range Groves, Ostrich Farms.
- S ea Shore Resorts and Amusement Zones, Summer Resorts, Stadium (where Olympic Games will be held, 1932).
- A irports, Airplane Factories, Alligator Farm, Angelus Temple, Art Galleries.
- N aval Station, Nature's Beauty Spots.
- G olf Courses and Clubs, Grauman's Chinese Theatre.
- E ducational Institutions.
- L aboratories, Libraries, La Brea Fossil Pits.
- E xposition Park.
- S chools, Sports, Stock Yards, Scenery.
- 1 Splendid Convention and Big Time for All.
- 9 ty Miles in one Sight-seeing Trip, Many Shorter Ones.
- 3 Big Nights of Entertainment.
- 0 H BOYS! D-O N-O-T M-I-S-S T-H-I-S  
C-O-N-V-E-N-T-I-O-N !!

The International Dairy Congress will be held in Copenhagen, Denmark, during the month of July, 1931, under the auspices of the International Dairy Federation.

## THE USE OF LOCAL ANESTHETICS IN CASTRATION OF THE MALE DOMESTIC ANIMALS

By JULIUS MAURER

*Surgical Clinic, New York State Veterinary College at Cornell  
University*

Castration is an operation that is performed in all countries, and on practically all domestic animals, male and female. The manipulation of the sex organs is very painful, and purely from the humane point of view it is our duty to spare the animal as much pain as we possibly can. We do this by the administration of a general narcotic, or by the use of a local anesthetic.

In all operations upon the sex organs of females some form of anesthesia is used. For instance, in the mare and cow, chloral hydrate; in the sow, chloroform; in the bitch, morphin, or morphin combined with atropin and chloroform; and in the cat, ether. Many veterinarians spay females under local anesthesia. They swab the vaginal wall of the mare and the cow with a 2-4 per cent solution of novocain before they make the incision. The results secured from the use of epidural anesthesia in this operation are also very gratifying.

What are the conditions regarding the narcosis of males for castration? Inasmuch as surgical interference with the sex organs is exceptionally painful, should we not strive to diminish the pain in these operations? I am convinced that many veterinarians have never taken this thought into account.

Every veterinarian is well qualified to perform a castration on a stallion, but many undertake the operation with a certain feeling of discomfort. The operation itself is not so much a source of worry as the casting of the animal, and fear of the complications which may result. We all know that in castrating a stallion there is danger not only to the operator and his assistants, but to the stallion itself. What is really the cause of these complications which can interfere with the success of the operation? I am convinced that when the proper methods are used in casting horses, accidents occur much less frequently than is generally supposed. The cause of the complications is invariably to be found in the fact that when the painful manipulation on the spermatic cord is begun, the animal uses every ounce

\*Received for publication, February 21, 1930.



of strength to break its bonds, and in the forcible contraction of the muscles power enough can be exerted to break the vertebrae, femur, tibia, and other bones, or to rupture the muscles themselves and their covering fascia.

A typical case of this kind was reported by Prof. Bayer,<sup>1</sup> in 1881. The author was castrating a very unruly pure-bred stallion which fought the restraining bonds with great violence after he had been cast, and threw himself back and forth during the operation. Suddenly, just as the operation was being completed (probably during the crushing of the second spermatic cord), the animal raised his head powerfully, then fell back on the straw and made a rattling noise in his throat. When he had been released the horse rose up on his fore feet, but had lost the use of his hind legs. He died in 12 hours. Postmortem examination disclosed a complete shattering of the last dorsal vertebra with hemorrhage into the spinal canal, and crushing of the spinal cord.

#### LITERATURE RECORDS NUMEROUS ACCIDENTS

Such accidents, however, are not the only dangers to which the animal is exposed. If one will go through the literature with this point in mind, one will find here and there an animal that died of so-called shock while being castrated without anesthesia. Rudolph<sup>2</sup> has noted this several times in the castration of boars, and Victor Baxa<sup>3</sup> has found the same to be true. Froehner and Schmidt<sup>4</sup> tell, in their book on general surgery, of a similar case which they saw in a bull calf. Schmidt<sup>5</sup> also cites a case of a stallion castrated by Nennkoff without anesthesia, which died of shock. In this case Nennkoff opened the scrotum with a deep cut, the incision injuring the testicle. The animal promptly went into convulsions and died. Postmortem examination was completely negative.

The same experience has come to me three times, with boar pigs that were 2, 3 and 6 months old. All three were in exceptionally good condition. The shock occurred each time when the first spermatic cord was crushed, the following symptoms being noted: When the skin incision was being made, and while the spermatic cord was being laid bare, the animals made a great deal of noise and tried hard to escape; during or after the crushing of the cord, they suddenly ceased to struggle, and in a short time were completely unconscious. Artificial respiration was begun at once, two of the pigs finally recovering. These were able to endure the severing of the second spermatic cord with the use of a local

anesthetic. The 3-months-old pig, extremely fat, died in spite of all efforts to revive him.

Our question now is: Are we in a position to eliminate all of these dangers by the use of narcotics or of local anesthetics. The answer is: Yes.

All of the castrations of stallions which I saw as a student were preformed when the animal was under chloroform. Later I often administered chloral hydrate. Although I was well pleased with these narcotics, I frequently asked myself if a local anesthetic would not do just as well. In 1925-6, Fisher,<sup>5</sup> of Munich, reported good results in castrating under local anesthesia. He used novocain, alypin and tutocain interchangeably. Urged by him, I adopted his method, injecting 5 cc of a 2-3 per cent novocain-adrenalin solution between the tunica vaginalis communis and the testicle of the horse, and using the same amount subcutaneously in the scrotum. In the smaller animals proportionately less of the solution is used. By gentle massage a good distribution of the anesthetizing fluid is secured through infiltration of the tissues.

#### METHOD APPEARS TO BE SIMPLE

The execution of this method seems easier at first glance than it really is. For the beginner it is not easy to inject the fluid into the small space between the tunica vaginalis communis and the tunica vaginalis propria. Blood-vessels of the testicle may be injured in the attempt, as I have found more than once. In this event much blood spurts out when the tunica vaginalis communis is cut, which, though not dangerous, does not make a good impression upon the owner of the horse. After the needle has been properly inserted, the slightest movement of the animal during the injection may cause the tunica vaginalis communis to slide off the tip of the needle, so that the anesthetic is merely placed under the dartos.

If the injection of the anesthetizing fluid is properly made, careful observation of the ensuing operation will show the following: When the skin is cut and the testicle is exposed, the horse does not struggle, as there is no pain. The activity of the cremaster muscle is completely obliterated, which greatly eases the work of the operator. When the cord is crushed, one will note, in spite of the anesthesia, some struggle, which, though slight, indicates that even when properly injected the spermatic cord does not always get enough of the anesthetic.

Professor Schmidt,<sup>5</sup> of Vienna, mentions in connection with this procedure that he has also seen injury to the vessels of the cord by the hypodermic needle, which might have a bad effect in the course of a possible infection. He recommends the following modification of the procedure: The animal is cast and brought into the desired position (left side or back position). After carefully cleaning and disinfecting the field of operation and injecting the anesthetic subcutaneously, an incision is made through the cutaneous covering of the scrotum, and the tunica dartis is split. The testicle, covered by the tunica vaginalis communis, is grasped and pulled out. Then a very small incision is made in the tunica vaginalis communis, preferably to one side of the testicle.

When there are adhesions between the tunica gavalis propria and the tunica vaginalis communis (periorchitis adhesiva), the incision is made higher up, in the region of the epididymis or of the cord, because such adhesions very seldom extend up along the cord. Through this breach Schmidt places a dull needle in the direction of the inguinal canal, and injects the anesthetic in this way. The needle must be 12 to 22 cm. (5 to 9 inches) long for the horse, and can be fastened to a Record syringe. Schmidt recommends the use of a rubber tube between the syringe and needle, so that in subsequent movement of the animal there will be no injury to the animal, nor breakage of the needle or syringe. The same procedure is followed on the other testicle. Schmidt says that the injection of 10 cc of a 2 per cent novocain-adrenalin solution into the cavity of the tunica vaginalis of each cord leads to complete loss of sensation in the horse, while 1 or 2 cc will produce the same effect in a dog.

#### DEFINITE PROCEDURE OUTLINED

Since the publication of this method of anesthesia, I have used it several times in the castration of horses, mules and pigs, and the results are very satisfactory. To get really good results with the method of administering local anesthesia outlined by Schmidt, a definite procedure is highly important. The following points should be emphasized: After the horse has been cast and the entire scrotal region has been disinfected, a suitable anesthetic is injected where the two scrotal incisions are to be made. The first incision is made for the lower testicle, and then the small opening into the tunica vaginalis communis is made, as already described, and the anesthetic is applied on the nerve supplying the cord. Then this testicle is covered with sterile gauze, the

right side of the scrotum is opened, and the nerve on that side is anesthetized. Not until now is the emasculator used on the left cord, which, meantime, has lost all power of registering sensation, due to the action of the anesthetic. After this the right spermatic cord is crushed. Only by following this procedure is it possible to work without waiting for the anesthetic to act, and still allow a sufficient length of time to elapse, so that osmosis will carry the anesthetizing fluid to each nerve, permitting the operation to be completed without pain. It is important that the anesthetic be injected at a place high enough so that the cords are anesthetized at the point where the emasculator is to be applied.

It is important also, especially with boars, to have the animal in the proper position. He should not be castrated standing, as this would permit most of the anesthetic solution to flow backward immediately upon injection, and a part of it would be lost through the incision in the tunica vaginalis communis. The correct application of this method of local anesthesia affords complete assurance of a painless castration, and eliminates all of the dangers associated with the pain of the operation.

#### FISHER'S TECHNIC FOR ANESTHESIA

Another method of administering local anesthesia has recently been reported by Fisher,<sup>7</sup> after having been used for two years in the Surgical Clinic at Munich. When the horse has been cast and is lying on the left side or on the back, the neck of the scrotum is grasped in the left hand, so that the thumb and index finger hold the spermatic cord in place, while the testicle rests on the other three fingers. The testicle is now drawn away from the body just far enough to draw the cord tight without causing pain to the animal. At a point near the body of the horse, the skin of the scrotum is rubbed with ether and the stretched skin and the tunica vaginalis communis are punctured by a quick stab with a needle that is especially constructed, it being provided with a hook to hold it in place. With a little practice one can readily feel when the tunica vaginalis communis has been perforated, and 5 cc of a 4 per cent novocain solution should now be injected into the processus vaginalis peritonei. The same steps are taken with the other spermatic cord. Now about 5 cc of the same novocain solution is injected subcutaneously at the points where the scrotal incisions will be made.

Fisher says that this method has proven to be very satisfactory in a large number of cases, and it may be used by any practitioner.

It can not be used with boars, because the neck of the scrotum is too short.

I regret not to have sufficient personal experience with this method of administering local anesthesia to express an opinion, but I am afraid that the beginner will often puncture the vessels of the cord and produce a hematome. I believe that, with the method outlined by Schmidt, the anesthetic can be placed more accurately, and a better degree of anesthesia will be secured for that reason. In spite of these possible drawbacks, I like Fisher's new method very much, because it is very simple, and may be used in all different methods of castration (covered and uncovered operations, with clamps, emasculator, or ligature).

I have decided to report on these two very practical and cheap methods of administering local anesthesia for the castration of the male domestic animals, to impress upon those veterinarians who still castrate without endeavoring to lessen the pain, how easy it is for all of us to perform this operation painlessly. Some will oppose my views, and not without reason, on the ground that castration is an operation that is performed quickly, and the pain is not of long duration. This does not alter the fact that this particular operation is exceedingly painful. Why should we not spare the animals pain wherever possible, as we do in all other operations?

Our duty in any operation lies not merely in aiding the owner and ourselves financially; it should be our highest duty to prevent or relieve pain whenever possible in the defenseless animals which we have subjected to our will.

Dr. Westhues,<sup>8</sup> of Giessen, says, at the end of his discourse on the use of narcotics in domestic animals:

I want to praise the American veterinarians because they have maintained their compassionate human feeling to a high degree in their profession, and because as a rule they make no incisions without anesthesia.

We want to thank Dr. Westhues heartily for this high praise. Whether or not it is really deserved let each man decide for himself.

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## SOMETHING ABOUT THE VETERINARY PROFESSION IN EGYPT

By A. M. WAHBY, Gizeh, Egypt

*Member of the Egyptian Educational Mission*

In my conversations with various American veterinarians I have been impressed by the fact that very few, if any, know the truth about the Egyptian veterinarians, their training and their achievements in combating and eradicating animal diseases.

This word is to give a brief account of the veterinary activities in Egypt. To fulfill this purpose it may be divided into two parts: (a) veterinary education and (b) veterinary organization.

*Veterinary education in Egypt:* A scientific veterinary education was introduced to Egypt about one hundred years ago. The first veterinary school was founded in Egypt in 1831, during the reign of Mohammed Aly Pacha, head of the present royal Egyptian family. This school was intended to supply the army with qualified veterinarians. It was at first under the supervision of French instructors and continued so until the Egyptians, who were at that time on European missions, became able to replace the foreigners. The school was continued under the Egyptians and the teaching was given in the Arabic language.

In 1881, financial troubles compelled the authorities to close the school and to send a few students to France to study veterinary medicine. This policy affected the veterinary profession severely, as the number of veterinary surgeons began to diminish and at the same time many contagious diseases broke out. As the fellah (the Egyptian farmer) depended chiefly upon cattle in his work, and as these were horribly endangered by the cattle plague, the Egyptian government hastened to establish a veterinary school. This was opened in 1901. Although it was at first somewhat primitive in its equipment (as most veterinary schools were), the school was afterwards recognized as a higher college. In 1920, a large modern school, equipped with all modern means of teaching, was erected in Gizeh, a town between Cairo and the Pyramids.

A large modern hospital is attached to the College, where all facilities are provided for diagnosis and treatment of different animal diseases as well as many surgical cases. In this hospital, the senior students practice under the supervision of their teach-

ers at least one month of their vacation, which usually amounts to four months in the summer.

The matriculation requirement for admission to this college is five years of high school education. The course of study is not less than four full years, in which the students have to study a syllabus very similar to that of the Royal College of Veterinary Surgeons of London. The branches to be studied are as follows:

In the first year: osteology, physics, chemistry, biology, hospital practice and etymology.

In the second year: anatomy, physiology and histology, with their practical courses.

In the third year: pathology, bacteriology, materia medica, hygiene, dietetics and principles of breeding.

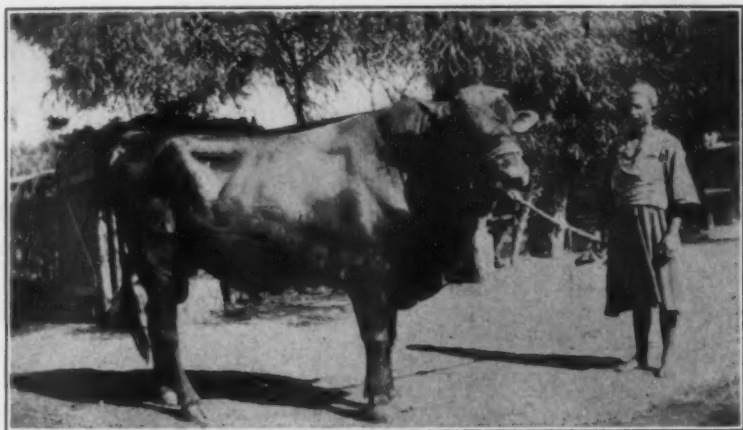


FIG. 1. Egyptian bull used at Gemmeseh (Government Breeding Experiment Station)

In the fourth year: surgery, medical jurisprudence, meat inspection, parasitology and state veterinary medicine.

It is well to mention here that all these branches, except the jurisprudence, hygiene and state veterinary medicine, are studied in the English language. The three latter branches are studied in the Arabic language, which is the official language of Egypt.

After having successfully passed all the final examinations in the subjects indicated above, the student at the end of the fourth year must pass a practical and theoretical examination held by an outside commission appointed by the Ministry of Education in Cairo. The members of this commission are usually occupying senior posts in the other departments of the government and a few foreigners are sometimes appointed among the members.

The total enrollment is now about eighty. Teachers of the school, who take part in examining the students, are both English and Egyptian professors from the other faculties. It is the policy now in Egypt to replace the foreigners in the governmental posts by the able Egyptians who have studied on foreign missions, and it is expected that all the professors will soon be Egyptians.

From the above-mentioned facts, it can be emphasized that the graduates of the Egyptian Veterinary College are not less qualified in executing their duties, either as state veterinarians or as practitioners, than their colleagues in Europe or the United States.

*Veterinary organization in Egypt:* There is an organization in the Ministry of Agriculture, in Cairo, resembling closely in its functions the United States Bureau of Animal Industry and it is called the "Veterinary Division." The only difference between the two organizations lies in the fact that Egypt has no states. Therefore, the Veterinary Division has more liberty than the American organization. It is responsible for taking protective measures, including the eradication of animal diseases, inspection of imported and exported animals and supervision of all slaughtering establishments in Egypt, except Alexandria, whose veterinarians belong to the city. To fulfill these objects, the Division has its men distributed in the provinces and districts overseeing the safety of the live stock according to decrees and regulations re contagious diseases.

The Division has a pathological laboratory in Gizeh, where diagnostic and research problems are worked out. In addition there is a large serum institute in Abbassieh, in Cairo, erected in 1905, originally to produce anti-cattle plague serum, although it produces now some other sera too.

Regarding the meat inspection, Cairo has a large modern abattoir equipped with all up-to-date facilities for slaughtering and inspection. It is controlled by at least six veterinarians who execute their duty under modern meat-inspection regulations. Together with the macroscopic inspection, microscopic examination of the carcasses in the abattoir laboratory is resorted to when needed.

Cattle and sheep are the animals mostly used for slaughtering. Next to them are the camel and pig. Horse meat is sometimes used for consumption among the poorer classes of foreigners. Although pork is not consumed by the Mohammedans, who form

the majority of the population, pigs are slaughtered for the foreigners' sake.

Not only Cairo has such a modern meat-inspection system, but all other provinces and districts have the same establishments and regulations, but on a small scale.

As to the supervision of imported and exported animals, there are four main quarantine stations in Egypt, *i. e.*, Alexandria, Port-Said, Suez-Harbor and Cataract quarantine stations. The latter lies between Egypt and the Anglo-Egyptian Sudan and it is supervised by the Veterinary Division. However, Alexandria, Port-Said and Suez Harbor quarantine stations are supervised by an International Quarantine Administration. Therefore, there are a few foreign veterinarians along with the Egyptians.

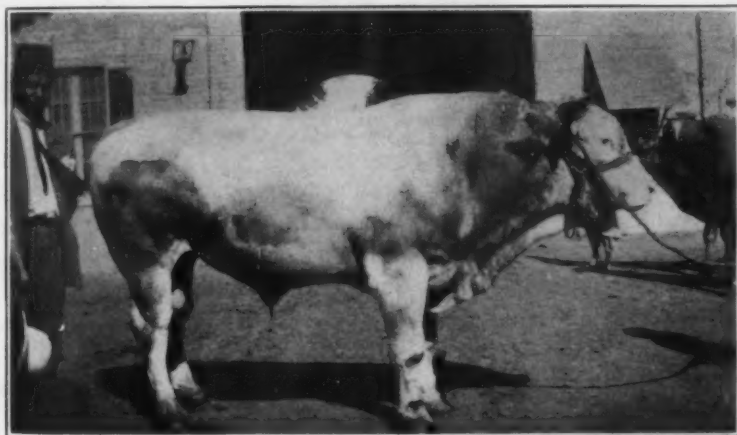


FIG. 2. Semintaler bull imported from Hungary and used at Government Breeding Experiment Station.

The suspected animals are slaughtered in the quarantine abattoirs where the stomachs, heads, feet and other parts are boiled and the skins immersed in suitable disinfectant solutions. All persons entering such abattoirs are provided with special garments, which they change before leaving the abattoir, then disinfecting their hands and feet. All refuse is either burned or buried. Such precautions are often taken to prevent contagious diseases from entering into the country.

It is hoped that these three quarantine stations will soon be under the supervision of the Egyptian Veterinary Division which is directed by an Egyptian. Regulations for prevention of cruelty to animals and for the inspection of the meat and milk

supply as well as controlling contagious diseases are enforced by the government for the welfare of the Egyptian people.

Besides the Veterinary Division, we have another one for animal husbandry, quite independent in administration from the former. It is charged with the breeding and development of improved types of horses, donkeys, cattle, sheep and poultry. Together with the selection of the best types of native animals, some foreign purebred animals are imported for crossing purposes. Figure 1 illustrates an Egyptian bull used in the Government Breeding Experiment Station at Gemmezeh, in Gharbieh Province, while figure 2 illustrates a Semintaler bull imported from Hungary.

This division, which is directed also by Egyptians, cooperates in its work with another national breeding and agricultural organization called the "Royal Agricultural Society." This society selects the best types of foreign or native purebreds, distributes them among the fellaheen (the Egyptian farmers) and charges them insignificant amounts of money for fertilizing their animals.

Private veterinary surgeons are very few in Egypt. Three or four practitioners are practicing in Cairo, largely on small animals, and about the same number in Alexandria. The cause of this scarcity in veterinary practitioners is referred to the confidence of the fellaheen in the Veterinary Division men, to whom they bring only their diseased animals.

In conclusion, Egypt has a modern system of veterinary science and serious efforts are being carried out to raise the standard of live stock production in different lines as well as to protect the country from infectious animal diseases.

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### **Tuberculosis in Hogs Declining**

A decline of tuberculosis in market swine at the large meat-packing centers is shown by federal meat-inspection records. In the past fiscal year the number of hog carcasses condemned as unsuitable for food because of tuberculosis was 9,170 less than in the previous year, and the number of parts of carcasses condemned for the same cause was 115,995 less. These figures represent declines of about 20 per cent. The eradication of tuberculosis among cattle on farms where hogs are raised is the chief reason for the improved condition of the hogs, officials of the U. S. Department of Agriculture believe.



# CLINICAL AND CASE REPORTS

## A NOTE ON SUBCUTANEOUS TUBERCULOUS LESIONS

By ROBERT GRAHAM, FRANK THORP, JR., and W. A. JAMES

*Laboratory of Animal Pathology  
University of Illinois, Urbana, Ill.*

*Case 1:* Holstein cow, age 5 years, reacted to an intravenous injection of avian tuberculin, but was repeatedly negative to the intradermal test for tuberculosis. Small, round, subcutaneous nodules varying in size from one-half to slightly more than one

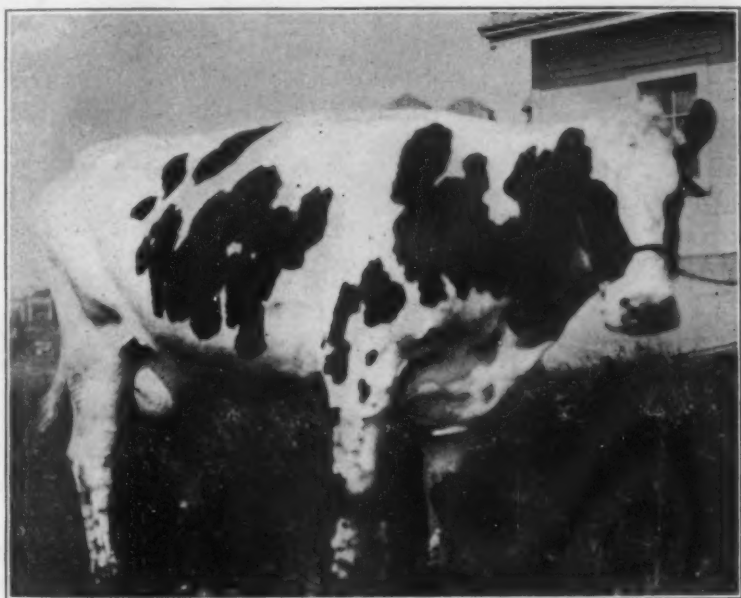


FIG. 1. Subcutaneous nodules in case 1. These varied in size and appeared along a lymphatic vessel. On removal there was no tendency to return.

inch in diameter were discernible on the lateral side of the right front leg, extending from above the carpal joint to the region of the prescapular lymph-node. The nodules were firm yet movable beneath the skin, on palpation (see fig. 1). After removal of

subcutaneous nodules, she again reacted to avian tuberculin administered intravenously.

The larger nodules, upon surgical removal, were found to be fibrous, encapsulated, circumscribed abscesses containing thick, yellow pus. Stained smears of the pus showed a few scattered acid-fast rods, although no groups or clumps were observed. The pus from several nodules was macerated in physiological saline solution and injected subcutaneously into three guinea pigs. After an interval of 90 days, the inoculated guinea pigs were killed. The livers of the three guinea pigs showed small, discrete, white necrotic foci upon the surface, and smears upon microscopic examination revealed scattered acid-fast rods. The spleen of one guinea pig was markedly enlarged and showed many subcapsular, white nodules, which extended throughout the parenchyma. Acid-fast microorganisms were observed in direct smears made



FIG. 2. Spleen of guinea pig showing necrotic foci following subcutaneous injection of nodules from case 1. The lesions were mild or non-progressive in character, yet in gross appearance suggestive of a tuberculous infection.

from the spleen of this pig (fig. 2). Histopathologic study revealed microscopic lesions characteristic of tuberculosis, with acid-fast microorganisms in giant-cells.

Four months later, some of the smaller nodules were surgically removed. Direct smears of the lesions containing small amounts of caseous pus showed a few scattered acid-fast rods. A histopathologic study revealed a marked fibrosis of the nodules with numerous giant-cells, some of which contained acid-fast microorganisms. Many epithelioid cells also were observed.

Guinea pigs injected subcutaneously with this material showed no evidence of tuberculosis when killed after a period of 90 days. Two rabbits and two fowls were inoculated subcutaneously, but died before 90 days had elapsed. None revealed lesions or acid-

fast organisms in the internal organs at death. About six months later, another biopsy was performed and the few visible, small, nodular growths remaining were removed. Direct smears failed to reveal acid-fast microorganisms. The tissues were emulsified in physiological saline solution and injected subcutaneously into two guinea pigs and two chickens. The latter were from a healthy flock and free from tuberculosis, as determined by the tuberculin test. One guinea pig died 11 days after inoculation. The inoculated chickens were tested with avian tuberculin at the end of 90 days and one fowl reacted. At autopsy none of the animals of this group displayed gross lesions of tuberculosis and stained smears of the internal organs of the reacting fowl were negative to acid-fast microorganisms.

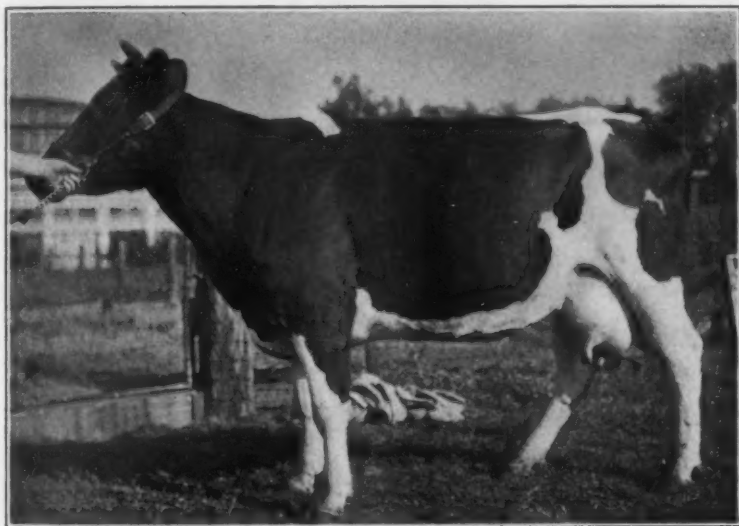


FIG. 3. Apparently healthy cow (case 2), with slight enlargement or induration of the skin in the left metatarsal region.

#### SUMMARY

Subcutaneous nodules on the lateral side of the right leg, extending from the carpal joint to the prescapular lymph-node, on biopsy revealed acid-fast microorganisms in small numbers. Mild lesions were induced in the liver and spleen of guinea pigs inoculated with suspensions of the pus from the nodules. The cow repeatedly gave a negative intradermal reaction to tuberculin (B. A. I.), but reacted positively to avian tuberculin administered intravenously on two occasions. Before and after the surgical removal of the lesions, no lesions of tuberculosis were induced by

inoculating chickens, but one fowl became sensitized to avian tuberculin 90 days following subcutaneous injection of the pus from the nodules.

*Case 2:* Holstein cow, age  $4\frac{1}{2}$  years (fig. 3), reacted to the intradermal test for tuberculosis, as well as to avian tuberculin administered intravenously. The left hind limb of this animal showed a noticeable thickening of the skin in the region of the third metatarsal bone. The process extended from the proximal



FIG. 4. The induration (case 2) might escape attention, yet a careful inspection revealed an unhealed ulcer. A chronic cellulitis with subcutaneous induration was apparent.

to the distal end of the bone and involved the medial anterior surfaces, yet was more pronounced on the lateral side. A small ulcer was noted on the lateral tarsal area, which showed very little tendency to heal. On palpation the skin was found to be indurated with numerous subcutaneous, circumscribed, flattened enlargements which were firm on palpation (fig. 4).

A biopsy was performed, September 17, 1929. The hyperplastic tissue contained yellowish, granular, necrotic foci varying

from 1 to 3 centimeters in diameter. The pus in the yellowish foci was emulsified in physiological saline solution and injected subcutaneously into three guinea pigs. The guinea pigs died from 30 to 70 days after injection. Autopsy of the pigs revealed no lesions of tuberculosis or acid-fast microorganisms in any of the internal organs.

On October 1, 1929, the cow was killed. The skin was carefully dissected from the region of the third metatarsal bone and

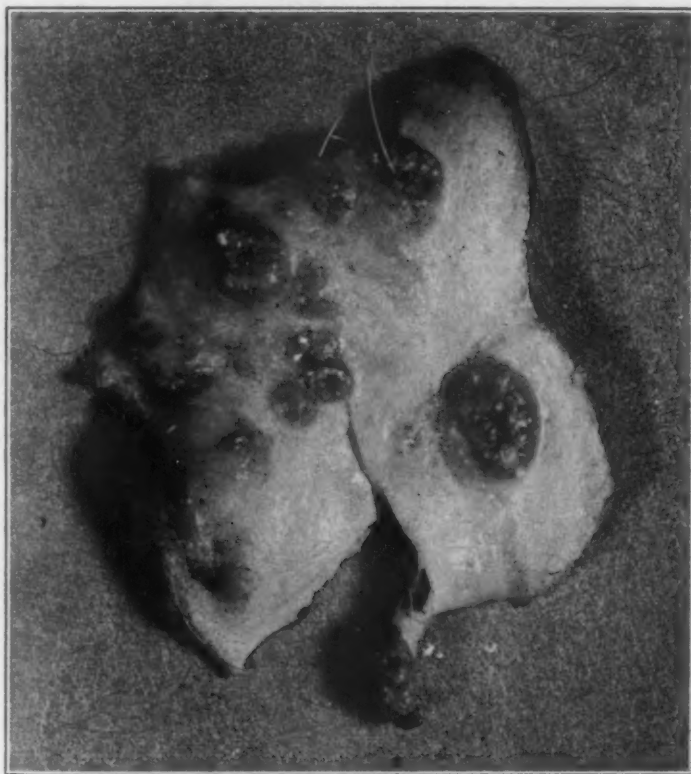


FIG. 5. Subcutaneous tubercles surgically removed from case 2.

numerous circumscribed yellowish nodules (0.5 to 6 centimeters in diameter) containing caseated pus were found (figs. 5 and 6). Direct smears from the necrotic lesions revealed numerous acid-fast microorganisms. A histopathologic study of the nodules revealed a connective tissue hyperplasia with epithelioid and giant cells. A few acid-fast microorganisms were demonstrated in tissue preparations.



The caseous pus was emulsified in physiological saline solution and injected subcutaneously into two rabbits, two guinea pigs, and two chickens. The guinea pigs and rabbits died before the observation period of 90 days had expired and none revealed gross

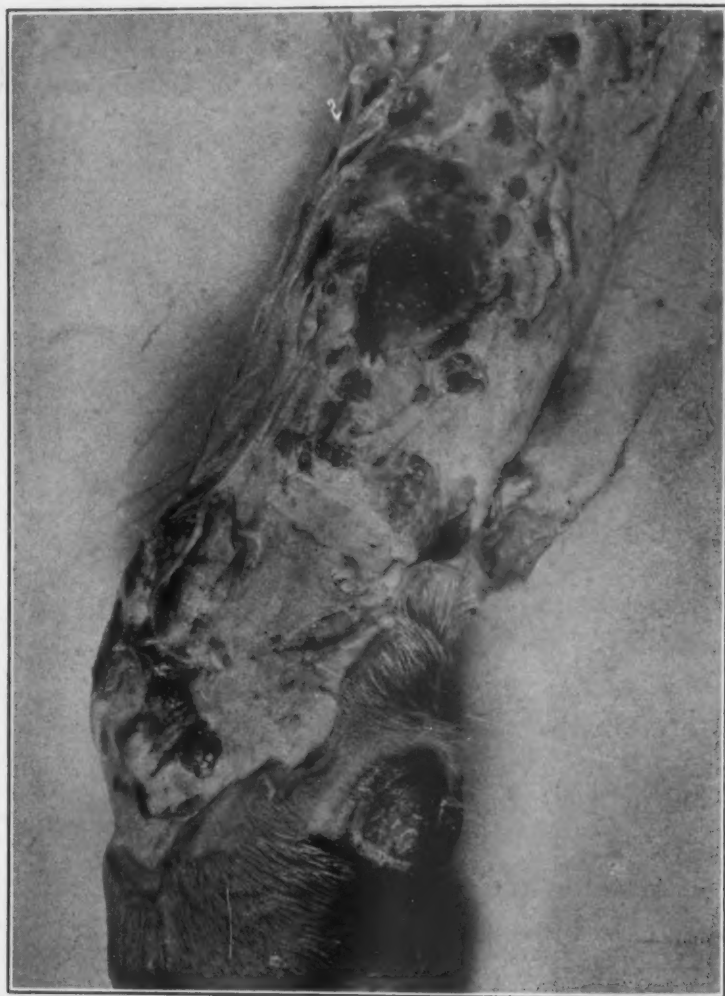


FIG. 6. Numerous circumscribed lesions varying in size presented the appearance of benign tubercles.

lesions of tuberculosis. Likewise the liver and spleen were negative in stained smears. Both fowls became sensitized to avian tuberculin, 60 and 90 days after inoculation.

## SUMMARY

The subcutaneous gross lesions resembled tuberculosis, while stained smears showed acid-fast rods indistinguishable from *Mycobacterium tuberculosis*. The invasive properties of the virus *in vivo* could not be demonstrated by injecting rabbits and guinea pigs subcutaneously but their antigenic properties were suggested following subcutaneous injection of healthy chickens.

## LUNG LESIONS IN AVIAN TUBERCULOSIS

By LYMAN R. VAWTER, *Reno, Nevada*

*Nevada Agricultural Experiment Station*

Recent papers dealing with avian tuberculosis have given accounts of the location of the lesions found in this disease.

Review of some work done in an infected flock of chickens in this state, in 1925, revealed an unusual number of tubercles in the lungs. The owner of this flock submitted two emaciated hens, both of which showed generalized tuberculosis upon laboratory examination. In one hen, large tubercles were found in the connective tissue around the trachea. The other hen showed acute miliary lesions in the lungs.

A visit to the ranch revealed bad sanitary conditions and a number of "light" hens in the flock. An intradermal tuberculin test, conducted on the 135 hens in the flock, revealed forty-seven reactors.

The reactors were removed from the flock and brought to the laboratory. Table I is based on the postmortem examination of 49 hens examined from this flock and includes the two hens originally submitted for diagnosis.

TABLE I—*Distribution of lung lesions in avian tuberculosis*

LOCATION OF LESIONS	PERCENTAGE
Lungs.....	49.0
Pleura.....	6.1
Intestines.....	59.1
Liver.....	87.7
Spleen.....	61.2
Gizzard.....	2. +
Vertebrae.....	2. +
No visible lesions.....	4.0

With the exception of the lungs, the incidence of lesions in the various organs closely approximates the figures given by Kernkamp<sup>1</sup> in a discussion of a recent paper by Hays.

The lung lesions were caseous, waxy structures, varying from 2 to 10 mm. in diameter and well encapsulated. Acid-fast bacilli were very numerous in the lung lesions.

#### DISCUSSION

The percentage of lung lesions found in this lot of hens was much higher than is ordinarily observed. Direct infection by way of the respiratory tract appeared quite plausible upon examination of the premises.

Carcasses of chickens dead of tuberculosis were found scattered around the place. Between the buildings was a pile of dead hens. More were found in the chicken-house. The litter of the house had obviously been in use for several months, as it was pulverized to a layer of dust.

The dusty litter unquestionably contained a large number of tubercle bacilli when the number of intestinal lesions found is taken into account. Scratch feed was thrown into the litter and the hens raised a thick cloud of dust while searching for feed. The high proportion (49 per cent) of lung lesions suggests infection by inhalation of dust laden with tubercle bacilli.

This flock consisted mainly of two-year-old hens. The owner was advised to slaughter the remaining non-reactors in the flock, institute a rigid clean-up, and allow the poultry equipment to remain unoccupied for at least six months before restocking.

#### REFERENCE

- <sup>1</sup>Kernkamp, H. C. H.: Discussion of Hays, C. H.: Avian tuberculosis in Nebraska. Jour. A. V. M. A., lxxv (1929), n. s. 23 (5), p. 562.

### ILEO-COLIC INTUSSUSCEPTION IN A PIG

*By L. P. DOYLE, Lafayette, Ind.*

*Department of Veterinary Science  
Purdue University Agricultural Experiment Station*

Intussusception is generally believed to result from excessive peristalsis. The case reported here occurred in a 60-pound shote, which had been fed rat poison consisting mainly of powdered red squill. The animal showed retching and violent vomiting within a few minutes after being given the rat poison. These symptoms of gastric irritation subsided at the end of about an hour. Thereafter, the pig showed well-marked depression, which lasted for about 30 hours. Then there was considerable improvement in the appearance of the animal, but the appetite was decreased and there were periods of listlessness. At the end of five days, there

had been considerable loss of weight and no improvement in appetite. The pig was then killed.

Postmortem examination showed a large, firm mass in the first centripetal coil of the colon. This mass was found to be invaginated ileum. As would be expected, the invaginated ileum was greatly swollen and had begun to undergo necrosis. The lumen of the invaginated gut was still patent but the opening was very small. Other lesions found were a marked gastritis and slight nephritis.

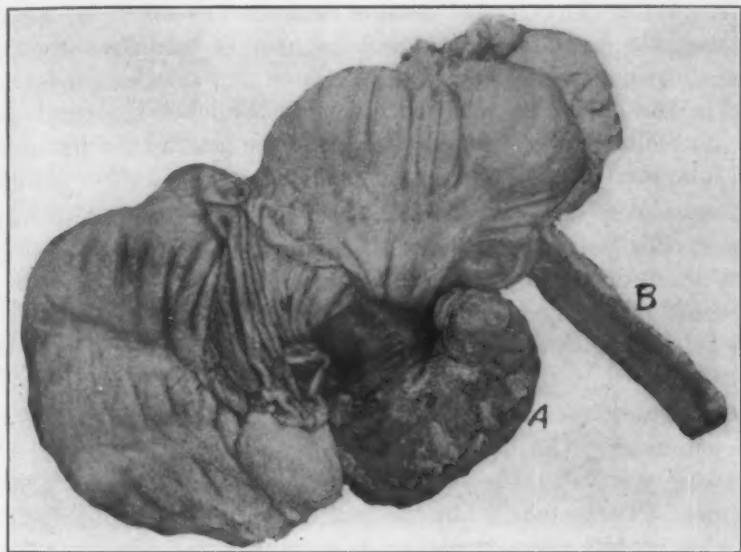


FIG. 1. Colon and part of the ileum. The colon has been opened to show the invaginated portion of the ileum (A). The normal size of the ileum is shown at B.

Another pig which had been fed the rat poison died within 24 hours. On autopsy it showed intussusception of the ileum; pronounced gastritis, characterized by abundant mucous exudate, marked edema of the stomach wall and some hemorrhage; acute degenerative myocarditis; and marked degenerative parenchymatous nephritis.

### LUXATION OF HEAD OF FEMUR IN COW

By C. A. CARY, Auburn, Ala.

*Subject:* A grade Jersey cow, four years old, weighing 600 pounds, was brought to college clinic in truck.

*Symptoms:* Right hind limb was apparently paralyzed, projecting forward and outward, stiff and straight. Unable to flex

any of the lower articulations. At first the cow was placed in a sling and an examination was made for injuries. After two days, the cow was removed from the sling and a complete examination was made. With one hand in the rectum, an enlargement was found in the obturator foramen. By raising or abducting the foot, the enlargement in the obturator foramen would fall or disappear. By dropping or adducting the limb, the enlargement in the foramen would rise or return. The great trochanter was slightly back of its normal position.

*Diagnosis:* Luxation of head of femur. The notch, or space, between the great trochanter and the head of femur was resting on, or up against, the side of the ischium, and the head of femur was in the obturator foramen. Hence, the lever movement of the limb alternately lowered and raised the head of the femur in the foramen.

*Treatment:* The cow was given general chloroform anesthesia. A sack filled with straw was placed high up between the legs with traction on the limb to overcome the more or less relaxed muscles. With slight lever movement, the head of the femur was brought back into the acetabulum. Then the limb could be flexed.

*Postmortem:* The cow, in three days, was killed and a post-mortem held. The head of the femur was still in its normal, replaced position. The capsular ligament was torn; the round ligament was stretched, but not entirely torn apart; some of the muscles behind the articulation were partly torn or lacerated. There was considerable infiltration between the muscles. The cause of the luxation was not determined. It had existed five to seven days before a diagnosis was definitely made. If it had been reduced immediately after it was dislocated, there would have been some chance for recovery. The head of the femur is held in place mainly by the muscles.

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## ANAPHYLAXIS AND THE OX WARBLE

By JAMES K. STROCKBINE, Bedford, Pa.

It is a rather common practice for farmers to express, with their fingers, the ox warble from the backs of cattle. I wonder if there is not some danger from this. The following is my report of a fatal case I diagnosed as anaphylaxis following the expression of ox warbles.



*Subject:* A grade Holstein cow, about six years of age and in perfect health as far as known. A few minutes after the cow had been fed, the owner squeezed out two warbles with his fingers. One came out easily and one possibly was crushed before it came out. About five minutes later, the cow became uneasy, stepped about, was very nervous and soon there was profuse lachrimation and salivation. The cow rapidly became worse. Edematous swellings appeared around the eyes and at the root of the tail and vulva. There was great weakness, collapse and death within an hour of the time the warbles were expressed. The cow was dead when I arrived and no postmortem was held. The above description is what the owner told me, along with the fact that about a month to six weeks before, he had expressed some warbles out of this same cow. The owner did not notice any marked dyspnea.

My conclusion, after eliminating all other possible troubles, was anaphylaxis. I believe the expression of the warble is accompanied with some danger. Is the killing of the warble with mechanical means accompanied with the same dangers, since the warble is left to be absorbed, especially if there should be two applications, a month or so apart?

*Editor's Note:* Three articles on this subject have been published in the JOURNAL. For the convenience of those who may desire to refer to them, we give the references:

Hadwen, S.: Hypodermal anaphylaxis. JOUR. A. V. M. A., xlix (1916), n. s. 2 (3), pp. 72-74.  
Hadwen, S., and Bruce, E. A.: Anaphylaxis in cattle and sheep, produced by the larvae of *Hypoderma bovis*, *H. lineatum*, and *Oestrus ovis*. JOUR. A. V. M. A., li (1917), n. s. 4 (1), pp. 15-41.

Hadwen, S.: Effects following improper methods of extracting *Hypoderma* larvae from the backs of cattle. JOUR. A. V. M. A., lx (1922), n. s. 13 (5), pp. 724-728.

## ARTHRITIS IN LAMBS AND ERYSIPELOTHRIX RHUSIOPATHIAE

By J. D. RAY, *Kansas City, Mo.*

*Kinsley Laboratories*

Following the announcement by Dr. G. T. Creech<sup>1</sup> of the definite recognition of swine erysipelas in the United States, the writer did considerable cultural work on this disease to determine the association of the *Erysipelothrix rhusiopathiae* with so-called "diamond skin" lesions and arthritis in swine, as found on the killing-beds in the packing-houses.

It is not uncommon to find polyarthritis in lambs on the killing-beds. While working with porcine specimens, a lamb's hock showing synovitis was examined and cultures made.

Organisms morphologically similar to the *Erysipelothrix rhusiopathiae* were found in the flaky synovia. This was interesting but no mention was made of it at the time, the idea being that more such specimens would be examined.

At various times during the year 1924, Dr. J. W. Parker, of the U. S. Bureau of Animal Industry meat-inspection force at Kansas City, Kansas, collected arthritis and synovitis specimens from lambs on the killing-beds and delivered them to the writer for further study. No information was available as to the origin of the sheep.

Inflamed joints from 22 lambs were examined. Ten gave cultures that were suspected as being *Erysipelothrix rhusiopathiae*. These were forwarded to Dr. John S. Buckley, chief of the Pathological Division, Bureau of Animal Industry, Washington, D. C., for his observation. The various laboratory tests as reported by the Pathological Division, including the complement-fixation test with known-positive swine erysipelas serum, revealed that three of the ten cultures forwarded for their examination were identical with *Erysipelothrix rhusiopathiae*. The seven others did not give positive serum reactions but were considered similar in many respects to this organism.

European literature cites *Erysipelothrix rhusiopathiae* as being associated with diseased conditions in various animals, but mention of it affecting domestic animals, other than hogs, in America, has not been noted.

It will be interesting to see reports from various parts of the country as to the prevalence of this infection in sheep.

#### REFERENCE

- <sup>1</sup>Creech, G. T.: The bacillus of swine erysipelas isolated from urticarial lesions of swine in the United States. *Jour. A. V. M. A.*, lix (1921), n. s. 12 (2), pp. 139-150.

### Two Conferences at Guelph

A veterinary conference for practitioners will be held at the Ontario Veterinary College, Guelph, July 7-11, 1930, under the direction of members of the College staff.

A conference relating to the fox industry will be held at the College, July 14-16, under the auspices of the Ontario Provincial Silver Fox Breeders' Association, in cooperation with the Ontario Department of Agriculture and the Ontario Department of Game and Fisheries. The course of instruction will be under the direction of the Ontario Veterinary College staff and the Experimental Fur Farm staff, at Kirkfield.

# ABSTRACTS



COMPARATIVE GROWTHS OF NORMAL AND INFUSORIA-FREE LAMBS. Elery R. Becker and Ralph C. Everett. Amer. Jour. Hyg., xi (1930), 2, p. 362.

Seven infusoria-harboring lambs failed to demonstrate a more rapid growth than seven infusoria-free lambs. They were fed on similar rations and weighed weekly. Although the infusoria-free lambs grew somewhat more rapidly than the normals, the authors feel that the number of lambs employed was not large enough to warrant a conclusion to the effect that the infusoria are a slight detriment to their host.

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PLASMODIUM ELONGATUM N. SP. AN AVIAN MALARIAL ORGANISM WITH AN ELONGATE GAMETOCYTE. Clay G. Huff. Amer. Jour. Hyg., xi (1930), 2, p. 385.

This paper contains a description of an interesting avian malarial parasite together with notes on some aspects of its biology. The vertebrate hosts are the canary (*Serinus canarius*) and the English sparrow (*Passer domesticus*). The invertebrate hosts are the following mosquitoes: *Culex salinarius*, *C. territans*, *C. pipiens* and *Aedes triseriatus*. This parasite was discovered originally by Dr. G. H. Boyd, in Georgia, in the English sparrow, in 1924.

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A NEW SOURCE OF OVARIAN FOLLICULAR HORMONE. J. A. Morrell, H. H. Powers and J. R. Varley. Endocrin., xiv (1930), 1, p. 28.

The ovarian follicular hormone has been demonstrated to be present in the fetal fluids of cows in sufficient amounts to warrant its extraction on a commercial scale and a process has been outlined for its extraction and partial purification. The hormone has been shown to be identical with that extracted from the ovary in that it will induce estrus in a spayed rat, menstruation in a spayed monkey and in an immature monkey, hasten the

opening of the vaginal orifice in an immature rat and has a feminizing action when injected into a male animal.

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DISTRIBUTION AND PREPARATION OF THE OVARIAN FOLLICULAR HORMONE. J. A. Morrell, E. W. McHenry and H. H. Powers. *Endocrin.*, xiv (1930), 1, p. 25.

A study of the occurrence of the estrus-inducing hormone in various animal tissues was made. A fairly wide distribution was found to exist but chiefly in the ovaries, liver, kidneys, muscle and blood of hogs and the pancreas, cotyledons, uterus and blood of the cow. A method is described by which the oil-soluble form was rendered water-soluble. A method is described also for the preparation of ovarian follicular hormone.

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PAPILLARY ADENOMA OF THE URINARY BLADDER IN THE OX. William H. Feldman. *Amer. Jour. Path.*, vi (1930), 2, p. 205.

The author reports on a case of papillary adenoma of the urinary bladder of a cow. The tumor was associated with calculi and a possible etiological relationship is suggested. From available data, it would appear that tumors of the urinary bladder of cattle are not common.

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A COMPARISON OF THE LESIONS OF FOWL POX AND VACCINIA IN THE CHICK WITH ESPECIAL REFERENCE TO THE VIRUS BODIES. C. Eugene Woodruff. *Amer. Jour. Path.*, vi (1930), 2, p. 169.

The histology of lesions obtained in chick epithelium following inoculation with vaccinia virus alone, fowl-pox virus alone, and the two mixed, is described. The characteristic virus bodies of fowl-pox, whether occurring in the skin or the cornea of the chick, give a positive reaction for fat. The Guarneri bodies of vaccinia do not stain for fat. Ludford's statement regarding the identity of the virus bodies of vaccinia and fowl-pox in the chick is refuted. His observations are due, it is believed, to the utilization of tissue from a mixed lesion of fowl-pox and vaccinia.

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THE PIGEON FLY AND PIGEON MALARIA IN IOWA. C. J. Drake and R. M. Jones. *Jour. Sci. (Iowa State College)*, iv (1930), 2, p. 253.

A very interesting description of the pigeon-fly (*Pseudolynchia maura*) is given. The fly is a bloodsucker and practically

a permanent parasite, as it spends almost all of its existence as a fly upon its host. In addition to the injury and annoyance caused directly by its feeding and irritating movements on the bird, the fly serves also as an intermediate host and is known to transmit two disease-producing protozoa of the common pigeon (*Columba livia*). *Haemoproteus columbae* is the causative organism of pigeon malaria, while the protozoon, *Trypanasoma hunnae*, has been reported as being found in the pigeon-fly and pigeon in Brazil. The adult fly is not known to feed upon other domesticated birds and fowls or wild birds in America. Thorough sanitation and dipping birds in pyrethrum soap have been found to control the fly.

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IMMUNOLOGICAL SIGNIFICANCE OF COLOSTRUM. I. RELATION BETWEEN COLOSTRUM, SERUM AND THE MILK OF COWS NORMAL AND IMMUNIZED TOWARDS B. COLI. Theobald Smith. Jour. Exp. Med., li (1930), 3, p. 473.

The protective antibody content of normal cow serum is below that of colostrum of the same animal. The method used does not permit the titration of the actual amount of the antibody in serum. Quantities up to 2 cc have no protective effect. The same limitations apply to the titrations of milk, owing to the introduction of large quantities of foreign protein into the peritoneal cavity of the guinea pig. When cows were immunized and a serum of high titre obtained, the antibodies in the milk of such cows rose to within the range of the method of testing. The relation of the protective capacity of serum to that of milk was approximately 1/120 and 1/40 in the two animals. These figures do not differ much from those obtained by early investigators titrating the antitoxic content of serum and milk of animals undergoing immunization with diphtheria toxin. In the two experiments on calves, 2 $\frac{1}{4}$  and 18 days old, respectively, fed a high protective serum, no increase in agglutinins or protective antibodies could be demonstrated. The postponement of colostrum to the twelfth and eighteenth hours, respectively, did not prevent normal growth.

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THE IMMUNOLOGICAL SIGNIFICANCE OF COLOSTRUM. II. THE INITIAL FEEDING OF SERUM FROM NORMAL COWS AND COWS IMMUNIZED TOWARDS B. COLI IN PLACE OF COLOSTRUM. Theobald Smith and Ralph B. Little. Jour. Exp. Med., li (1930), 3, p. 483.



The outcome of these experiments shows that feeding an adequate amount of serum (600 cc or more), either from normal cows or from those immunized with one type of *B. coli*, in place of colostrum, prevented the early fatalities attributable to *B. coli*, but did not protect all calves from renal lesions or fatal convulsive attacks during the second month of life. The complete history of the calves indicated a greater freedom from early diarrheas among those fed immune than among those receiving normal serum. The experiments bring out the fact that there is nothing qualitatively different in colostrum from normal serum but that the former is quantitatively more effective as far as content of antibodies is involved. That colostrum contains favoring substances, not present in serum, is not denied, but the experiments indicate that a sufficient quantity of serum is in 9 out of 10 cases capable of replacing colostrum without injury to the calf. The experiments indicate also that the chief and perhaps the only function of colostrum is to protect the young animal against an early invasion of miscellaneous semi-pathogenic microorganisms by way of the digestive and the umbilical tracts.

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TRANSMISSION OF PULLORUM DISEASE FROM CHICK TO CHICK.

John V. Weldin and Helen J. Weaver. Poultry Sci., ix (1930), 3, p. 175.

Pullorum disease may be spread from chick to chick through the droppings. Infection may result from entrance of the organism into the respiratory tract as well as into the alimentary tract. The authors believe, however, that the seat of post-hatching infection is more often in the digestive tract than in the respiratory tract.

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DOES COD-LIVER OIL OF HIGH ACID CONTENT HAVE TOXIC PROPERTIES? Arthur D. Holmes, Wm. B. Moore, J. Stanley Bennett and Madeleine G. Pigott. Poultry Sci., ix (1930), 3, p. 164.

The results obtained show that red cod-liver oils of high acid content may contain substances which are detrimental to young chicks. The red, high-acid cod-liver oils used in this investigation caused ruinous mortality when fed to young chicks. The chicks which were fed the red, high-acid oils until 14 weeks of age were, at that age, undesirable for being kept to grow to maturity. High-acid cod-liver oils may be of questionable value as a supplement to poultry rations.

MILK-BORNE RABIES. E. R. Mugrage. Jour. Lab. & Clin. Med., xv (1930), 5, p. 460.

A small series of rabbits, either injected with milk from rabid does or nursing these does, did not develop rabies. Evidence is not clear that rabies can be transmitted through milk, except from extraneous contamination. Further evidence shows with rare exception that ingestion of known virus does not result in rabies in test animals and the same results should hold for man.

BRUCELLA ABORTUS INFECTION IN MAN. Alfred S. Giordano and R. Lloyd Sensenich. Jour. Lab. & Clin. Med., xv (1930), 5, p. 421.

A clinical study of 35 patients infected with *Brucella abortus* is presented. An effort is made to define more closely the clinical course on the basis of predominance of symptoms as to the particular body structures involved. The results suggest that *Br. abortus* infection tends to run a clinical course, septic in type, without characteristic pyrexial undulations or relapses, and terminates in recovery without notable sequelae. The illness, if protracted, presents a clinical picture sufficiently distinctive to make clinical recognition possible, but early diagnosis must depend on bacteriologic and serologic studies. Symptomatic treatment with rest in bed is the author's treatment at present.

BRUCELLA AGGLUTININS IN THE BLOOD AND MILK OF COWS. Robert Graham and Frank Thorp. Jour. Inf. Dis., xlv (1930), 3, p. 260.

A negative agglutination test with milk serum is not a reliable indication of the *Brucella* agglutinin content of the blood of the same animal. The authors observed that the disagreements between the blood and the milk agglutination for the same animals consisted largely of negative reactions in milk serum when the blood of the same animal was positive. The standard tube method was used in testing all samples. Milk serum was obtained by adding one drop of rennin to 4 or 5 cc of milk and after incubation for 30 minutes at 37° C., the clot was broken and the clear whey brought to the surface by centrifugation. The results of 172 agglutination tests with blood and milk serum from the same lactating animals in two herds showed that 78 (45.35 per cent) were positive to the blood serum agglutination test and 45 (26.16 per cent) were positive to the milk serum agglutination

test. It is concluded that the agglutination test of milk serum is not so reliable a diagnostic aid for the presence of infectious abortion as the blood serum agglutination test.

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COWS INFECTED WITH *STREPTOCOCCUS EPIDEMICUS*. W. D. Frost, R. C. Thomas, Mildred Gumm and F. B. Hadley. Jour. Inf. Dis., xlvii (1930), 3, p. 240.

*Streptococcus epidemicus* (Davis) was found in the milk of 17 cows. Two of them were associated with an epidemic of septic sore throat. The fifteen other cows were giving milk which was mixed with a considerable quantity of other milk and used as food. Eight of these cows were found, during the course of four years, in certified herds of approximately 1200 cows, which had been regularly tested at monthly intervals. The other seven were accidentally discovered in small herds. The authors think that cows infected with *Strep. epidemicus* are rather widely and generally distributed, and that this streptococcus undoubtedly occurs quite generally and frequently in milk used for direct consumption, as well as that which is used for cheese and butter-making without producing disease. The infection of cattle with this human type of streptococcus apparently begins as a mild disease, which may become very severe or apparently continue a mild course. There is a tendency for the infected portions of the udder to lose their milk-secreting function. In the group of mild cases to which most of the cows belong, there was little or no change from the normal in either the udder or the milk, although *Strep. epidemicus* may be shed in large numbers. Of the 13 cows in which the extent of the infection was determined, 7 cows (53 per cent) were infected in only one quarter, 4 cows (31 per cent) were infected in two quarters, and two cows (16 per cent) were infected in three quarters, although the infection in different quarters did not occur simultaneously. The strains of *Strep. epidemicus* were apparently all virulent and are identical with those strains isolated from epidemics from either man or cow.

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STOMACH INFUSORIA OF RUMINANTS AND THEIR HOSTS. Elery A. Becker, J. A. Schulz and M. A. Emmerson. Jour. Sci. (Iowa State College), iv (1930), 2, p. 215.

The infusoria of the ruminant stomach are of no substantial value to their host in converting plant proteins into more easily digestible animal protoplasm. They are of no appreciable value

to their host in the digestion of carbohydrates. There is no demonstrable symbioses between the infusoria and cellulose-digesting bacteria of the rumen. They do not serve any significantly useful purpose in suppressing the number of Schizomycetes in the rumen. Apparently they do not perform any mechanical services of any value in the rumen and neither do they have any effect upon the hydrogen-ion concentration of the rumen. The physical well-being of the host is not perceptibly improved by removal of this fauna. Since there is no reason for regarding these infusoria either as constituting a useful endofauna or as true parasites, they must be consigned to the status of mere commensals.

### Doctor Brunett Goes to Poultry Congress

Owing to the inability of Dr. W. T. Johnson, of Corvallis, Oregon, to attend the World's Poultry Congress, in London, this month, President Ferguson has appointed Dr. E. L. Brunett, of the New York State Veterinary College, Cornell University, as the official representative of the A. V. M. A. Dr. Brunett left Ithaca June 14.



Hollywood Bowl, Hollywood, California



## CHANGES RELATIVE TO VETERINARY OFFICERS

### Regular Army

Colonel Ray J. Stanclift, upon his own application, has been ordered to proceed to his home on or about June 12, 1930, to await retirement.

Captain Allen C. Wight is relieved from further duty at Fort Sam Houston, Texas, effective on or about June 25, 1930, and assigned to duty at the Army Veterinary School, Army Medical Center, Washington, D. C.

Orders have been amended assigning 2nd Lieut. Arvo T. Thompson to duty at Front Royal quartermaster depot, Front Royal, Va.

Captain Solon B. Renshaw is relieved from further duty at Fort Meade, S. D., and directed to report to the commandant, Army Veterinary School, Army Medical Center, on or about August 25, 1930, for duty for the purpose of pursuing a course of instruction.

Captain Burlin C. Bridges is relieved from further duty at The Cavalry School, Fort Riley, Kansas, and directed to report to the commandant, Army Veterinary School, Army Medical Center, on or about August 25, 1930, for the purpose of pursuing a course of instruction.

Orders have been amended assigning 2nd Lieut. Harvie R. Ellis to duty at Fort D. A. Russell, Texas.

Captain Stanley C. Smock is relieved from further duty at the Presidio of San Francisco, Calif., and directed to sail on transport scheduled to leave that port for New York, N. Y., on or about July 30, and upon arrival directed to proceed to Fort Hoyle, Md., for duty.

Second Lieutenant Ralph W. Mohri is relieved from further assignment and duty at Fort Benning, Ga., effective on or about June 25, 1930, and directed to proceed to Washington, D. C., and report to the commandant, Army Medical School, Army Medical Center, for duty.

Captain Claude F. Cox is relieved from further duty at Ft. Hoyle, Md., and assigned to duty at the Army Veterinary School, effective on or about August 25, 1930, for the purpose of pursuing a course of instruction.

Lt. Colonel Herbert S. Williams has been ordered to proceed to his home on or about June 1, 1930, to await retirement, for physical disability.

### Veterinary Reserve Corps

#### *New Acceptances*

Rankin, Fay G. . . . . 2nd Lt. . . . . 310 Columbia Blvd., St. Helens, Oreg.  
Nichols, J. H. . . . . 2nd Lt. . . . . 540 Prairie St., Paris, Ill.

#### *Promotions*

Barr, Albert Clyde . . . to Major . . 3227 Tracy St., Kansas City, Mo.  
Roberts, John J. . . . to Major . . 608 James Street, Columbus, Wis.  
Bibens, David H. . . . to Capt. . . 8246 Woodland Ave., Kansas City, Mo.  
Davis, Elmer N. . . . to Capt. . . Fort Scott, Kansas.  
Dietrich, LeRoy E. . . to Capt. . . 1820 Parker St., Wichita, Kans.  
Matter, Anthony J. . . to Capt. . . Estherville, Iowa.  
Strickler, Don B. . . . to Capt. . . Box 1104, Columbus, Ga.  
Van Zandt, Earl J. . . to Capt. . . 714 Marshall Ave., Marshall, Mich.  
Heath, McKenzie . . . to 1st Lt. . . County Health Dept., Decatur, Ala.  
Picht, Clyde W. . . . to 1st Lt. . . 268 W. Wyoming St., St. Paul, Minn.



## COMMENCEMENTS

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### ALABAMA POLYTECHNIC INSTITUTE

The commencement exercises of the Alabama Polytechnic Institute were held May 20, 1930. In the College of Veterinary Medicine the following graduates received the degree of Doctor of Veterinary Medicine:

W. L. Flanagan  
W. J. Isbell  
H. Odom

L. J. Pate  
D. W. Rainey  
J. W. Thone

E. H. Walker

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### KANSAS STATE AGRICULTURAL COLLEGE

The sixty-seventh annual commencement exercises of the Kansas State Agricultural College were held at Manhattan, May 29, 1930. In the Division of Veterinary Medicine the degree of Doctor of Veterinary Medicine was conferred upon the following:

Raymond Hilton Alexander  
Lyle Holmes Beebe  
Edwin Lewis Brower  
Joseph Eugene Clair  
Dave Miles Colby  
Theodore Marion Devries  
Cloyde Lowell Guinn  
Lewis Greeley Hamilton

Ralph William Jackson  
Thomas Joy Leasure  
Thomas Jerome Muxlow  
William Alfred Romary  
Harry Edwin Skoog  
Henry Devore Smiley  
Eugene Ware Theiss  
Edgerton Lynn Watson

The following graduates received commissions as second lieutenants in the Officers' Reserve Corps of the United States Army:

Edwin Lewis Brower  
Theodore Marion Devries  
Lewis Greeley Hamilton

Harry Edwin Skoog  
Henry Devore Smiley  
Edgerton Lynn Watson

Thomas Joy Leasure and Henry Devore Smiley were the honor students in the Division of Veterinary Medicine.

Dr. Carl Alfred Brandley (K. S. A. C. '23) and Dr. John Wallace Lumb (K. S. A. C. '10) received the degree of Master of Science.

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### STATE COLLEGE OF WASHINGTON

The commencement exercises of the State College of Washington were held June 2, 1930. Nineteen men received degrees in veterinary medicine, as follows:

Frank Bell  
Merton Clarkson  
Ralph Cole  
Walter Allen German

Anthony Lavett  
Donald Morgan  
Richard Pflugrad  
William Sexton

Bert Hollingshead  
James F. Horr  
Orval Hostetler  
John King  
George Kuhn

Earl Simpkins  
Robert Pritchard  
John Stevens  
Don Stover  
Rex Taylor

Kenneth White

Most of the graduates took the Washington State Board examinations, June 3-4, and several took the Los Angeles County examinations, June 26. Six took the examinations for positions in the U. S. Bureau of Animal Industry, June 4. A majority of the men have taken positions or will go into practice at points in Washington, Oregon and California, according to information given by Dean Wegner.

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### COLORADO AGRICULTURAL COLLEGE

At the commencement exercises of the Colorado Agricultural College held on June 5, 1930, there were ten graduates in veterinary medicine:

C. B. Barber  
Frank Cowley  
Ronald L. Cundall  
K. Kegham Goekdjian  
William D. Hoffmaster

Hilan F. Keagy  
Osborne G. Larsen  
Wilbur W. Myers  
C. Clarence Sundstrom  
James E. Wilson

The scholastic honors in this group went to Kegham Goekdjian, an Armenian student.

The commencement address was delivered by Julius C. Gunter, a former governor of Colorado.

During the week preceding commencement, at a meeting of the Colorado Veterinary Medical Association, held at the College, a large portrait of Dr. George H. Glover was presented to the institution as a mark of respect by the members of the State Association and former graduates of the College. This portrait now hangs in the Veterinary Building. Dr. H. E. Kingman, in making the presentation at the annual banquet of the Association, told of the high esteem in which Dr. Glover was held by all former students of the institution as well as all veterinarians within the country. He related that Dr. Glover had been graduated at the Colorado Agricultural College in 1884, later obtaining his veterinary degree at Iowa State College, and had come back to the Colorado institution as head of the Veterinary Department in 1901, which position he has since held. He was elected president of the American Veterinary Medical Association in 1910.

### IOWA STATE COLLEGE

Commencement exercises at Iowa State College were held in the State Gymnasium, Monday, June 9, 1930. On that occasion President R. M. Hughes conferred the degree of Doctor of Veterinary Medicine on 27 graduates. This was the third largest class to be graduated from Iowa State College. The number this year was equalled in 1919 and surpassed in 1918 with 30 graduates, and in 1911 with 29.

Due to irregularities in their schedules, two members of the senior class were unable to complete the course, but will be graduated later in the year. Those graduated are as follows:

Walter R. Anderson  
Clarence L. Bohan  
Robert M. Buck  
Erle R. Carter  
Victor J. Cook  
John K. Dewar  
James H. Emmerson  
Vurl E. Fisher  
James C. Fleming  
Austin T. Getz  
Joseph S. Gordon  
Carl H. Horstman  
Earl D. Hubbard

Hugh A. Linn  
F. Howard Matson  
Leland C. Morley  
Laurence E. Mosbach  
John Paul Oldsen  
Walter N. Peterson  
D. Gunnard Quist  
Robert J. Schoffman  
Lewis Spolum  
Arthur L. Stigers  
Claire E. Treman  
Oscar M. Vorthmann  
Peter W. Wassenaar

John W. Weinhof

Dr. Walter R. Anderson led the group in scholarship and accordingly was awarded the George Judisch Prize, consisting of initiation fee and membership dues for four years in the A. V. M. A.

Three members of the class, Drs. Anderson, Carter and Treman, were elected to the national honorary society of Phi Kappa Phi and to Gamma Sigma Delta honor fraternity.

Most of this year's class expect to enter private practice. Dr. Getz has accepted a position in the Department of Anatomy at Iowa State College. Dr. Morley goes to Virginia Polytechnic Institute to accept a research fellowship, and Dr. Emmerson has accepted a position with the Animal Rescue League, in Boston.

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### OHIO STATE UNIVERSITY

The fifty-third annual commencement exercises of the Ohio State University were held in the Ohio Stadium, Tuesday, June 10, 1930. The commencement address was delivered by Manley Ottmer Hudson, S. J. D., Bemis Professor of International Law, Harvard University Law School.

One honorary degree was conferred at this time, the recipient being Orville Wright, of international fame in the science of aviation.

The College of Veterinary Medicine presented the following candidates for the degree of Doctor of Veterinary Medicine:

Cameron Wesley Argue	Carroll Kirkman Mingle
Densil Clyde Bartlett	Earl N. Moore
William Theodore Brinker	John Kenneth Morrow
Charles Clarence Crago	William Hugh Pavey
Herbert Jacob Eichhorn	Kenneth B. Sherer
Oscar Bruce Gochnauer	Ervin Edwin Slatter
William Alonzo Higgins	William Vance Stevens
Howard Russell Hinchman	Stanley Ernest Taylor
Ormond John Hummon	Ralph Austin Wilson
Leslie Edwin Johnson	Fail Winfred Robson

Charles Forest Runnels

The degrees were conferred by President George W. Rightmire, and diplomas awarded following the formal presentation of the candidates by Dean Oscar V. Brumley.

Ten members of the graduating class immediately filed applications for membership in the A. V. M. A.

### CORNELL UNIVERSITY

The annual commencement exercises at Cornell University were held June 16, 1930. The degree of Doctor of Veterinary Medicine was conferred upon the following:

David Earle Armstrong	Clair Owen Joslyn
John Henry Barrett	William George Keller
Ernest Cecil Baxter	Ernest Victor Maginnis
Frank Bloom	John Gibson Marvin
Frederick George Caslick	Clifford Howard Milks
Harold Chapin Clark	Edwin Darius Peck
Paul John Doran	Jesse Sampson
Bernard James Errington	Lansing C. Schantz
Lincoln Elmer Field	Leonard Lewis Tyler
Richard Edward Guthrie	Vincent Paul Vangura
Charles Henry Hoefle	William Leonard Weitz
David Hopkins	George Wohnsiedler

The following prizes were awarded for the academic year 1929-1930:

*The Horace K. White Prizes (Meritorious students):*

First Prize	Frank Bloom
Second Prize	William George Keller

*The Hollingworth Honorarium (Pathology and bacteriology):*

Frank Bloom

*The Jane Miller Prizes (Veterinary physiology):*

First Prize	Abraham Kleinfeld
Second Prize	Raymond C. Klussendorf

*The James Gordon Bennett Prize (Surgical clinics):*

Clifford Howard Milks

*The Anne Besse Prize (Veterinary medicine)*. Bernard J. Errington

*The Charles Gross Bondy Prizes (Small-animal clinics):*

First Prize.....Clair O. Joslyn

Second Prize.....David Hopkins

*The Merry Prizes (Anatomy):*

First Prize.....John C. Stevenson

Second Prize.....James K. Howard

## UNIVERSITY OF PENNSYLVANIA

At the annual commencement exercises of the University of Pennsylvania, held June 18, 1930, the degree of Doctor of Veterinary Medicine was conferred upon the following:

Lee Godfrey Barnwell

Lester Russell Barto

Abram Temple Bowen

Merton Lorenzo Briggs

Harold Eugene Dapson

Charles Merle Dibbell

Orville Herrick Drumm

William Humphrey Dunn

George William Hugger

(*cum laude*)

Abraham Komarov

Robert Parker Lawrence

(*cum laude*)

Edward Daniel McKinney

Richard Morris Parry

Palace Henry Seitz

Donald Milton Snow

Jay Brown Stauffer

Cornelius Francis Sullivan

James Rufus West

The J. B. Lippincott Prize of \$100, for the highest general average for the entire four years of the course, the Jeannette Blair Prize of \$50, for the best work done in the Small Animal Clinic, and the T. E. Munce Prize of \$25, for the highest general average in the courses in Animal Husbandry, were all awarded to George W. Huggler.

## BUREAU TRANSFERS

Dr. H. C. Berger (Cin. '17) from Bay St. Louis, Miss., to Palestine, Texas, on tick eradication.

Dr. Ira W. Eichelberger (Ind. '13) from Cleveland, Ohio, to Washington, D. C., on meat inspection.

Dr. C. P. Lunneen (McK. '17) from Muscatine, Iowa, to Aurora, Ill., on virus-serum control.

Dr. E. G. Pigman (K. C. V. C. '13) from Standpoint, Idaho, to Chicago, Ill., on meat inspection.

Dr. H. M. Springer (Ind. '17) from Chicago, Ill., to Indianapolis, Ind., on meat inspection.

Dr. J. A. Thompson (K. C. V. C. '07) from Edwardsville, Kansas, to Grand Forks, N. Dak., on meat inspection.

Dr. J. E. Shelton (St. Jos. '08) from Waterloo, Iowa, to Denver, Colo., in charge of meat inspection.

Dr. H. J. Hoyman (Chi. '04) from Evansville, Ind., to Waterloo, Iowa, in charge of meat inspection.

Dr. O. W. Noyes (K. C. V. C. '04) from Kansas City, Kans., to Evansville, Ind., in charge of meat inspection.

Dr. Guy C. Juday (Chi. '14) from South St. Paul, Minn., to Chicago, Ill., on meat inspection.

Dr. O. A. Stingley (K. C. V. C. '02) from Albert Lea, Minn., to Topeka, Kansas, in charge of meat inspection.



## MISCELLANEOUS



### International Veterinary Congress

The eleventh International Veterinary Congress, to be held at the Central Hall, Westminster, London, S. W. 1, August 4-9, 1930, is receiving support from foreign governments in all parts of the world. Official delegates have already been appointed by the following countries:

Canada, New Zealand, Commonwealth of Australia, South Australia, Western Australia, Union of South Africa, Irish Free State, Northern Ireland, Gold Coast, Kenya, Uganda, Tanganyika Territory, Northern Rhodesia, South African High Commission Territories, Swaziland, Nigeria, Malay States, Straits Settlements, Iraq, Albania, Austria, Belgium, China, Denmark, Finland, Ecuador, Germany, Greece, Guatemala, Holland, Latvia, Nicaragua, Norway, Roumania, Sweden, Turkey, United States of America, Union Socialist Soviet Republics, Venezuela, Yugoslavia.

In addition to the scientific work of the Congress, there will be arranged a number of excursions to research institutes, veterinary colleges, racing and breeding establishments. These will take place during the week following the Congress.

On Sunday, August 3, there will be a reception in the evening (with music and refreshments), free to all members, at the Mayfair Hotel.

The opening meeting of the Congress, which will be attended by the Minister of Agriculture and Fisheries, will be held in the morning of Monday, August 4, and thereafter general meetings will be held each forenoon and four sectional meetings will be held simultaneously each afternoon.

On Tuesday evening, August 5, there will be a *conversazione* at the National History Museum, South Kensington, to which all members will be invited. There will be music and light refreshments.

On Wednesday evening, August 6, the British Government offers a banquet to officially appointed delegates, not exceeding 200 in number. The Minister of Agriculture and Fisheries will preside.

On Thursday evening, August 7, there will be a banquet at the Connaught Rooms, Great Queen Street, London, W. C. 2, open to all members. The price of the dinner, inclusive of wines, will be 25 shillings.

On Friday evening, August 8, there will be a reception given by the Lord Mayor and Corporation of the City of London at Guildhall. Special invitations will be issued to a limited number of members for the function.

Applications for membership of the Congress should be addressed to: Dr. Fred Bullock, General Secretary, eleventh International Veterinary Congress, 10 Red Lion Square, London, W. C. 1, England.

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### The Virus of Psittacosis

In the course of experimental studies on psittacosis at the U. S. Hygienic Laboratory, R. D. Lillie encountered certain focal lesions and minute intracellular coccoid and bacilliform inclusions in tissues from parrots in which the virus was presumably present and in material from a fatal human case. No reference to any such inclusions has been found in the accounts of any of the autopsies of human cases. However, most of the older cases were studied by methods unsuitable for the demonstration of such inclusions.

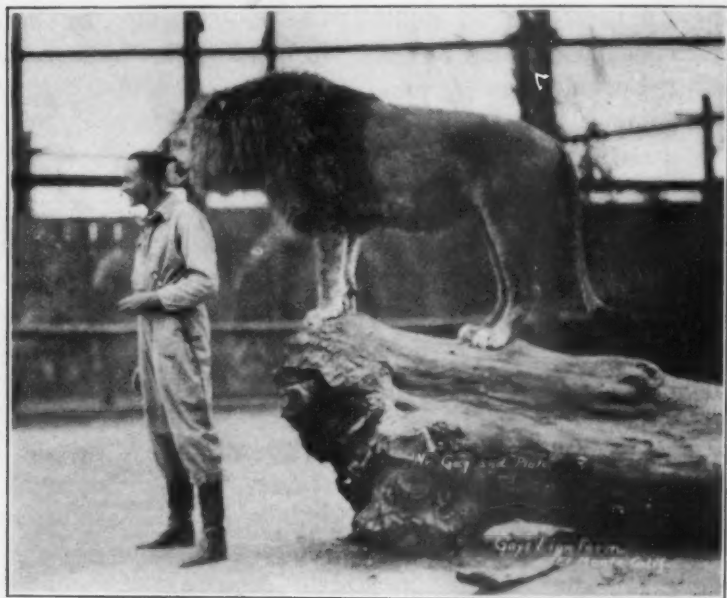
To facilitate future reference to these inclusions Lillie has thought best to name them and proposes the name *Rickettsia psittaci*, and defines the species as "minute Gram-negative intracellular coccoid and bipolar bacilliform bodies of about 0.2 to 0.3 microns in diameter, found in reticulo-endothelial cells, mesothelial cells, and large mononuclear cells of the parrot (probably *Amazon* sp.) and in large mononuclear cells in man, associated with, but without established relationship to, psittacosis."

Lillie adds that "while no etiologic relationship to psittacosis is claimed for these inclusion bodies at this time, their presence in presumably infected parrots and in the human case is suggestive and merits further study."

### The Gay Lion Farm

Located at the end of the famous old Santa Fe trail, and only a few miles from the meeting-place of the coming A. V. M. A. convention, is one of the strangest and most interesting farms in the world, the Gay Lion Farm. Here, in a five-acre jungle, is "Little Africa" itself, the home of over 170 lions of all ages, the only farm of its kind in all the world.

It is hard to realize that a short distance from the City of the Angels there exists a veritable African jungle, where more lions may be seen as if in their native haunts in one afternoon than could be seen in many years in Africa itself.



In the Lions' Den, Gay's Lion Farm, El Monte, California.

The A. V. M. A. convention visitors will have an opportunity to make a trip through this farm, not only for a thrill long to be remembered but for information of special interest to the profession. Both Mr. and Mrs. Gay (the lion farmers) will explain in person their methods and practices. From their successful experience in feeding, breeding and raising the King of the Forest in captivity, the veterinarian will receive many profitable suggestions for reflection and adaptation in his practice.

### Sodium Hypochlorite Solutions

Sodium hypochlorite solutions are effective as disinfectants or germicides in the absence of extraneous organic matter, but they can not be depended upon to kill all germs, including spores, under all conditions, says Dr. C. C. McDonnell, of the Food, Drug and Insecticide Administration. Therefore, claims on the label that the preparation will sterilize a surface or kill all germs, or unmodified claims such as "kills germs" or "destroys bacteria," or similar broad claims, are objectionable under the federal Insecticide Act. The manufacturer is responsible for all efficacy claims on the label, Doctor McDonnell says, and all claims should be based on the results of adequate tests.

Sodium hypochlorite solution is widely used as a disinfectant in dairies, creameries and in bottling works. It is an effective germicide and harmless to humans when it is of the correct strength and properly used.

The labels on all insecticides and fungicides, which include sodium hypochlorite, should bear no statement, design or device which is misleading to the purchaser in any particular. A statement must be given, in conspicuous type, of the name and percentage of each inert ingredient in the preparation unless the name and percentage of the active ingredient is stated, in which case it is sufficient to give the total percentage of inert ingredients. Under this clause of the Act, sodium hydroxid, in the amount usually found in this preparation, is not considered active.

As sodium hypochlorite deteriorates on standing, the rate depending on composition, container, temperature and other factors, the manufacturer should make certain that the preparation will have the strength claimed at the time of sale to the consumer.

The directions accompanying the package, for the use of this preparation as a disinfectant, should make clear that it is to be applied only to clean surfaces. The presence of organic matter, such as milk or cream in dairy utensils, greatly reduces its disinfecting efficiency.

A statement of the phenol coefficient, on the label of the preparation, is not permitted, because the potency of sodium hypochlorite as a germicide varies. In some cases it is much more powerful than phenol and in others it is less. It should not be labeled "non-toxic" or "non-poisonous," unless the clause is added, "when used as directed."



### OHIO CONFERENCE FOR VETERINARIANS

The fifth conference for veterinarians was held at the Ohio State University, March 19-21, 1930. Dean Oscar V. Brumley acted as chairman of the first session. He introduced the first speaker, Dr. C. H. Stange, of Iowa State College, who delivered a very fine talk on "Diseases of Swine." Owing to the position held by him in a hog-raising state like Iowa, Dean Stange was able to present his subject in a manner which was very pleasing to his audience.

Dr. H. B. Raffensperger, of the U. S. Bureau of Animal Industry, drew from the wealth of his experience with animal parasites in delivering a talk on "Parasites of Swine." The entire subject was covered in a very capable manner. This was not Dr. Raffensperger's first participation in a veterinary program before an Ohio audience. For this reason his appearance on the program, especially on such a timely subject, was looked forward to with considerable pleasure.

"Nutritional Diseases of Swine" was the subject of a talk given by Dr. H. C. H. Kernkamp, of the University of Minnesota. It is safe to say that no more enlightening talk on the subject of nutritional disorders could have been given than was this one. Dr. Kernkamp stressed the necessity of an adequate water supply in the prevention of some of the nutritional disorders common to swine. This is a point which has not received sufficient recognition in the past, not that we do not realize the necessity of water, but that we do not always appreciate what constitutes an adequate supply. This talk was illustrated with lantern-slides.

Dr. L. W. Goss presided over the afternoon session of the first day. Dr. Alvin Broerman delivered a talk on the "Control of Pullorum Disease." This subject was covered in the very able manner which characterizes all of Dr. Broerman's talks. He reviewed the older methods of control as well as the newer ones.



A description of the "aspiration method" of collecting blood for testing created considerable interest. In concluding, he enumerated some of the things which are essential if the pullorum disease is to be eliminated from an infected flock by means of the agglutination test.

"Diseases of Poultry" was the subject of a paper delivered by Dr. A. F. Schalk. Some interesting figures were given which were illustrative of the increasing importance of the poultry industry. In addition to a discussion of the more common diseases of fowls, both young and old, Dr. Schalk expressed the opinion that the veterinarian cannot afford to ignore this important industry.

Dr. R. E. Rebrassier gave the final talk of the afternoon. His subject, "Recent Observations on Internal Parasites," covered the more important parasites infesting the intestinal tract of fowls. His remarks were confined almost entirely to a discussion of the life cycle of these parasites, believing that, without a knowledge of the correct cycle, intelligent control measures and treatment can not be carried out.

The Wednesday evening session was held at Campbell Hall, following a dinner at Pomerene Hall. Dean Brumley acted as chairman, introducing President George W. Rightmire, who gave a very inspiring address. He pointed out very clearly the obligation which the University bears to the people of the State, and extended a hearty welcome to those present. He expressed himself as being in entire sympathy with our annual conference as a part of the University's educational policy. Wayne Dinsmore, secretary of the Horse Association of America, gave, as usual, a very interesting talk on "The Horse Situation of America." This talk was well illustrated with lantern-slides.

Dr. James D. Grossman acted as chairman of the morning session the second day, devoted entirely to the horse. The first speaker was Professor D. J. Kays and "Types and Breeds" was the subject of his most interesting talk, delivered in Professor Kays' inimitable manner. While mention was made of the four classes of horses to be found on the open market, such as the saddle, light and heavy harness and draft horses, the major part of the talk was devoted to the latter class. In addition to a discussion of this class from three essential standpoints: What is he? Why is he? How is he? Professor Kays placed particular stress upon the pedigrees in selecting individuals for breeding purposes.

"Diseases Incident to Breeding" was the subject of the next talk which was given by Dr. W. W. Dimock, of the University of Kentucky. Perhaps few men could have talked upon such a subject, with a larger store of personal experience from which to draw, than Dr. Dimock. Contagious abortion was discussed at some length. He emphasized the importance of careful examinations and complete and accurate breeding records. Many of the infections of the genital tract were said to be preventable by cleanliness preceding service.

Dr. H. B. Raffensperger gave the last talk of the forenoon. His subject was one which has been somewhat neglected in the past, "Internal Parasites of the Horse." Dr. Raffensperger certainly convinced his audience that more attention should be given this subject, both by owners and veterinarians. He called attention to the fact that the horse is the most heavily parasitized of our domestic animals.

Dr. J. N. Shoemaker directed the Thursday afternoon session. "Problems Confronting the Small-Animal Practitioner" was the subject of the first talk of the afternoon, delivered by Dr. J. F. Planz, a practitioner of Akron, Ohio, who really needs little introduction to audiences composed of veterinarians. Distemper, mange and fright disease were only a few of the conditions which were discussed by him in a very instructive and interesting manner.

In the next talk, on "Identification and Control of Intestinal Parasites," Dr. R. E. Rebrassier very carefully explained the technique of the sugar-solution method of examining fecal material. Lantern-slides were used to demonstrate the various steps involved in this method and also to show the parasites and parasite ova of the dog and other small animals.

Dr. I. E. Newsom, of the Colorado Agricultural College, gave the final talk of the afternoon of the second day. His subject, "Diagnosis and Treatment of Some Common Diseases of Sheep," was confined largely to those conditions affecting feeding lambs. The conditions, as mentioned, were divided into three groups; those associated with shipping, those associated with feeding and those produced by parasites. A few to receive particular attention were dysentery, hemorrhagic septicemia, coccidiosis and sore mouth. This very instructive talk was made more interesting by the use of a large number of lantern-slides.

The program Thursday evening was also held at Campbell Hall, following dinner at Pomerene Hall. Dean Brumley intro-

duced Mr. D. S. Bolon, who talked on the subject of "Simplified Bookkeeping for Veterinary Practitioners." "Collections" was the subject of a talk given by Mr. Felix E. Held. Both talks and the discussions which followed were innovations in our program and were very much appreciated by those present.

Dr. B. H. Edgington acted in the capacity of chairman for the Friday morning session. It was opened by Dr. W. G. Hollingworth, of Utica, N. Y. His subject was "The Practitioner and Municipal Inspection Work." Dr. Hollingworth has the distinction of having been voted the leading citizen of his home city recently. This was no doubt due to his activity in the Bureau of Health, covering a period of many years, and to say that he lived up to this reputation in the delivery of his talk would be stating the case very mildly. A very interesting motion-picture was shown which illustrated very clearly what a menace the fly is to the public health.

"A Standard Milk Ordinance and Question of Pasteurization of Milk," was the subject of a very fine paper by Dr. R. F. Leslie, Department of Health, Cleveland. In this discussion every phase of the subject of milk, from production to delivery to the consumer, was covered in a very able manner. The work done by Dr. Leslie in protecting human life and improvement of the dairy industry must be looked upon as a distinct credit to the veterinary profession.

Mr. W. A. Wentworth, Director of the Borden Company of Ohio, gave an interesting talk on "Quality Milk Through Cooperation Between the Veterinary Profession and the Milk Industry." The statistics on the value of dairy products in the United States as well as Ohio were of particular interest. Mr. Wentworth stressed the importance of veterinarians to the dairy industry. He seemed to feel that the members of the profession could do much more as educators in helping to bring about even better conditions in the industry than exist at the present time.

"The Relation of Bang's Disease to the Live Stock Industry and to Undulant Fever of Man" was the subject of a talk by Dr. Ward Giltner, of Michigan State College. The entire subject was treated in a very capable manner. The history as given was of particular interest. It seems that control and eradication of these diseases is another problem to be solved by our profession in cooperation with the laboratory workers and the dairy industry.

Dr. W. F. Guard directed the last session on Friday afternoon. He introduced as the first speaker, Dr. V. S. Larson, of Madison, Wisconsin. Dr. Larson spoke on "A State Program of Control of Bang's Disease." Dr. Larson mentioned the fact that in Wisconsin this work had largely been placed in the hands of practitioners. He explained in detail the method of organization. The education of the cattle-owners was one of the first problems. It was pointed out also that difficulty is encountered in this program, as in tuberculosis eradication, but that on the whole much advancement has been made. The fact that 8000 herds are being tested by the practicing veterinarians of Wisconsin seems to be sufficient proof of progress.

"Herd Management from the Viewpoint of the Individual Practitioner" was discussed by Dr. C. H. Case, of Akron, Ohio. Dr. Case first explained that by herd management he meant frequent inspection, with the idea of keeping the herd in a healthy condition or, in other words, the practice of preventive medicine. Preventive medicine in veterinary practice is going to mean much more in the future than at the present, which is in conformity with the popular idea of medicine in general. It was pointed out that the keeping of accurate individual records is absolutely essential in order to obtain the best results. In closing, Dr. Case extended a very cordial invitation to anyone present to go to Akron, where he would be glad to help them in this phase of practice.

Dr. T. H. Ferguson, president of the American Veterinary Medical Association, gave the final talk of the afternoon. The subject, "Common Conditions Encountered in Cattle Practice," was given in that very interesting manner so characteristic of Dr. Ferguson. A large part of the time was spent in a discussion of the surgical conditions of the head and neck. This created a good deal of interest as shown by the questions that followed.

The total attendance at the conference was 302. The evening sessions were well attended, there being 114 present on Wednesday evening and 150 on Thursday evening. The laboratory courses in serology, parasitology and autopsies seemed to be as popular as in previous years.

Of the total registration, 248 were from Ohio. The remainder came from fifteen other states and Canada. Practitioners numbered 164, while the other branches of professional activity were very well represented.

W. R. HOBBS, *Reporter.*

### BAY COUNTIES VETERINARY MEDICAL ASSOCIATION

The Bay Counties Veterinary Medical Association held its monthly meeting on May 13, 1930, at the Athens Athletic Club, Oakland, Calif. This was a specially arranged farewell dinner meeting in honor of Drs. E. M. Dobbs, F. M. Hays, G. H. Hart and C. B. Outhier, who were to leave about June 1, on a European tour to attend the eleventh International Veterinary Congress at London, in August. A very unusual program had been arranged by the committee in charge and a very enjoyable time was had by guests and members.

GEO. M. SIMMONS, *Secretary.*

### HUDSON VALLEY VETERINARY MEDICAL SOCIETY

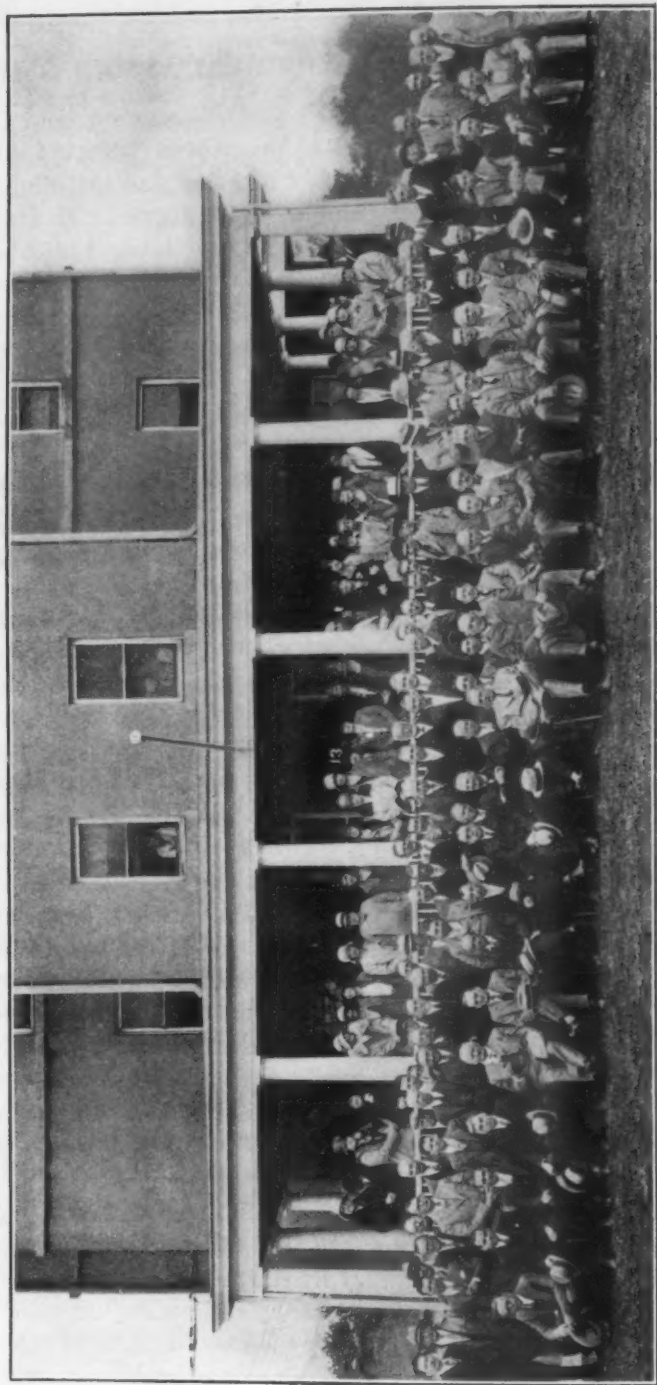
The regular quarterly meeting of the Hudson Valley Veterinary Medical Society was held at the Lederle Laboratories, Pearl River, N. Y., on May 14, 1930.

By special invitation extended through Dr. Adolph Eichhorn, the veterinary medical societies of New York County, New Jersey and Connecticut joined with the Hudson Valley Society in this meeting. As a result of this invitation, nearly 200 were present, including a considerable number of ladies. After being shown through the spacious laboratories of the Lederle Company the party enjoyed an excellent luncheon served by the young ladies of Lederle.

The meeting then convened and the guests were welcomed by Dr. Eichhorn, following which a short business session was held. This included discussion of the action of the Legislative Committee of the Society with respect to publicity, particularly by radio, of veterinary information by persons not qualified to give same. It was the consensus of opinion that all such publicity should be under the supervision of a competent authority or organization. The president was authorized to appoint a committee of five members to cooperate with Station WGY with respect to this and other similar matters.

The Society also approved the action of the Legislative Committee in its opposition to proposed legislation authorizing the investigation of diseases of poultry by the State College of Agriculture. A resolution was passed placing the Society on record as opposed to investigation of poultry diseases by agencies other than those properly trained and equipped to undertake such research.





Veterinarians and their guests in attendance at the meeting of the Hudson Valley Veterinary Medical Association, at the Lederle Laboratories, Pearl River, N. Y.,  
May 14, 1930.

Following the business session, Dr. W. H. Wright, of the U. S. Bureau of Animal Industry, Washington, D. C., gave an excellent paper on parasites, pointing out the most common varieties affecting domestic animals and some suggestions as to treatment. Dr. H. J. Milks, of New York State Veterinary College, followed with some practical suggestions as to treatment of small animals—surgical and otherwise.

J. G. WILLS, *Secretary*.

### CONESTOGA VETERINARY CLUB

The seventeenth Annual Shad Supper of the Conestoga Veterinary Club was held at the Stock Yards Inn, Lancaster, Pa., May 22, 1930.

The meeting was called to order at 5 p. m. An interesting talk was given by Dr. H. E. Bemis, Professor of Surgery, University of Pennsylvania, on "The History and Growth of the Veterinary Profession." Drs. T. E. Munce, Director, Pennsylvania Bureau of Animal Industry, and Geo. A. Dick, Supervisor of Veterinary Extension Work, University of Pennsylvania, supplemented this address with some very interesting facts illustrating the present favorable conditions existing in the profession.

Supper followed. Dr. R. C. Gross, of Elizabethtown, president of the Club, acted as toastmaster and kept our guests busy responding to his calls. Attendance numbered 59 and included a good representation from the Schuylkill Valley, Cumberland Valley and Keystone Veterinary associations.

Drs. H. W. Barnard, B. P. Chodos, Joseph Johnson and H. S. Weber constituted a committee on arrangements and the supper was enjoyed by all. We adjourned after discussing the holding of a joint meeting of the various clubs in the near future.

HENRY S. WEBER, *Secretary*.

### OKLAHOMA COUNTY VETERINARY MEDICAL SOCIETY

A new organization of veterinarians, which will be known as the Oklahoma County Veterinary Medical Society, was formed at a picnic held for veterinarians and their families at Lincoln Park, near Oklahoma City, May 27, 1930. This organization of veterinarians, representing nearly every branch of the profession, from Oklahoma City and nearby points, will hold monthly meetings in Oklahoma City. While the principal object of this

newly formed society is educational and for the discussion of strictly professional problems, it is hoped that some of the meeting can be devoted to purely social affairs.

Officers elected for the ensuing year are: President, Dr. R. W. Bowerman; vice-president, Dr. H. W. Ayers; and secretary, Dr. C. H. Fauks, all of Oklahoma City.

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### Visitors at the Journal Office

The first six months of 1930 saw quite a number of veterinarians as visitors at the JOURNAL office. Among those who called on various missions were: Dr. H. H. McIntyre, Rahway, N. J.; Dr. B. T. Woodward, New York, N. Y.; Dr. Julio San Miguel, Santiago, Chile; Lt. Col. R. C. Musser, Chicago, Ill.; Dr. Geo. H. Conn, Freeport, Ill.; Dr. J. E. Shillinger, Washington, D. C.; Dr. O. H. Muth, Corvallis, Oregon; Dr. G. P. Statter, Sioux City, Iowa; Drs. B. J. Killham, Ward Giltner, E. K. Sales, M. W. Emmel and R. P. Lyman, East Lansing, Mich.; Dr. W. N. Armstrong, Concord, Mich.; Dr. H. T. Carpenter, Dr. E. E. Patterson, Dr. C. M. Hamilton, Dr. Joseph Hawkins, Dr. John Hoberg, Dr. C. W. Eddy and Dr. Donald T. Kemp, all of Detroit.

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### California State Board Examination

The California State Board of Examiners in Veterinary Medicine will hold a special examination during the American Veterinary Medical Association convention, at the Ambassador Hotel, Los Angeles, California, August 26-29, 1930.



CHICAGO & NORTHWESTERN RAILWAY TERMINAL, CHICAGO

The Los Angeles Limited, carrying the A. V. M. A. special cars, leaves this station, Thursday evening, August 21, at 8:10 p. m.

# NECROLOGY



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## ROBERT A. WADDELL

Dr. Robert A. Waddell, of Concord, California, died April 25, 1930, of injuries received in an automobile accident.

Born in Scotland, in 1879, Dr. Waddell attended Dundee High School. His veterinary education was obtained at the San Francisco Veterinary College, from which he was graduated in 1906. He was engaged in general practice at Concord.

Dr. Waddell joined the A. V. M. A. in 1926. He was also a member of the California State Veterinary Medical Association. He is survived by his widow.

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## JAMES G. KLINESTEKER

Dr. James G. Klinesteker, of Salem, Michigan, died in a Holland, Michigan, hospital, May 30, 1930.

Born in Salem, March 26, 1883, Dr. Klinesteker received his veterinary training at the Grand Rapids Veterinary College. He was graduated in 1914 and practiced first at Hamilton, later at Dorr, and more recently at Salem. He is survived by his widow and four sons, his parents, four brothers and one sister.

Dr. Klinesteker was a member of the Michigan State Veterinary Medical Association.

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## GEORGE W. GILLILAND, JR.

Dr. George W. Gilliland, Jr., passed away at the home of his parents near Hope, Indiana, May 28, 1930, after an illness of six months, due to heart trouble.

Born November 9, 1883, Dr. Gilliland studied veterinary medicine at the Indiana Veterinary College. He was graduated in 1912 and practiced in the territory around Hope until about two years ago. He is survived by his widow, his parents, a brother and a sister.

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**HARVEY M. WAKELIN**

Dr. Harvey M. Wakelin, of Los Angeles, Calif., died June 4, 1930. Death resulted from a malignant tumor, from which the deceased had suffered for many months. He was 41 years of age.

Born near Paxton, Ill., Dr. Wakelin secured his veterinary education at the Chicago Veterinary College, from which he was graduated in 1910. He practiced at Paxton and Melvin, Ill., for short periods, later going to Los Angeles, where he conducted a small-animal hospital. He is survived by his widow, two sons, one daughter, his father and four sisters.

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**W. G. MIDDLETON**

Dr. W. G. Middleton, of Trenton, N. J., died June 13, 1930. He was in charge of tuberculosis eradication work in New Jersey and Delaware, for the U. S. Bureau of Animal Industry. Dr. Middleton was a pioneer in tuberculosis eradication work, having been engaged in this project for twenty years, in the eastern part of the United States.

Born at Prattsburg, N. Y., November 7, 1880, Dr. Middleton attended high school, Franklin Academy and Iowa State College. He received his veterinary degree from the latter institution in 1905.

Dr. Middleton joined the A. V. M. A. in 1918. He is survived by his widow (nee Bertha R. Peake).

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Our sympathy goes out to Dr. P. A. Johnson, of Little Rock, Ark., in the death of his father, at Tippecanoe City, Ohio, recently; to Dr. W. A. McDonald, of Little Rock, Ark., in the death of his mother, recently; to Dr. W. C. Glockner, of Little Rock, Ark., in the death of his sister at Cincinnati, Ohio, recently; and to Dr. Joseph Hawkins, of Detroit, Mich., in the death of his wife, June 4, 1930.

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**PERSONALS**

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**BIRTHS**

To Dr. and Mrs. Leland C. Lynch, of Middletown, Ohio, a daughter, Lila Lee, May 20, 1930.

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To Dr. and Mrs. L. R. Smith, of Sioux City, Iowa, a daughter, Alana Jeanette, June 4, 1930.



Dr. H. T. Melgaard (O. S. U. '24) has removed from Elk River, Minn., to Tyler, Minn.

Dr. B. L. Taylor (K. S. A. C. '20) has changed locations from Emmett, Idaho, to Monroe, Wash.

Dr. Charles Kronfeld (Chi. '17), formerly located at West Point, Va., has removed to New Kensington, Pa.

Dr. C. C. Hunt (Ind. '10), formerly of Chicago, has accepted a position in the Department of Health, Toledo, Ohio.

Dr. H. H. Blahut (Cin. '14), of Hot Springs, Ark., continues to hold his position as a member of his City Council.

Dr. F. R. Osborn (Ind. '17), of Little Rock, Ark., is one of the leading spirits in the promotion of a kennel club in this city.

Dr. Walter Wisnicky (K. S. A. C. '26) is Director of Live Stock Sanitation, Wisconsin State Department of Agriculture and Markets.

Dr. Harry E. Hapner (Chi. '18), of Arcanum, Ohio, has been appointed Justice of the Peace by the Board of Trustees of Twin Township.

Dr. G. Townley Price, Jr. (Ont. '20) has located at Lewisburg, Tenn., where he will be associated with Dr. J. M. Jones, State Veterinarian.

Dr. Louis E. Marbury (Ind. '10), who has been associated with the Illinois State Department of Agriculture for the past eleven years, has entered general practice at Centralia, Illinois.

Dr. H. W. Feldwisch (O. S. U. '13), who recently located for general practice in Coshocton, Ohio, has removed to Piqua, Ohio, and where he has opened an office at 509 South Main St.

Dr. W. J. Butler (N. Y.-Amer. '03), state veterinarian of Montana, was confined to his home the greater part of May, on account of illness. He was able to return to the office about June 1.

Dr. Clarence B. Denman (O. S. U. '09), of Newark, Ohio, recently announced his candidacy for the office of sheriff of Licking County, on the Democratic ticket, subject to the decision at the primary elections.

Dr. C. M. McFarland (K. C. V. C. '00) resigned his position as sales manager for the Allied Laboratories on June 1, and is now associated with the Missouri Valley Serum Company, of Kansas City, Kansas, in the same capacity.

Dr. H. E. Erickson (Ont. '22) holds the position of Chief of the Food and Dairy Division, Bureau of Health, Saint Paul, Minnesota. Dr. Erickson was appointed to this position after a competitive civil service examination.

Dr. H. K. Wright (Mich. '15), of the Veterinary Department of H. K. Mulford Company, Philadelphia, recently returned from a business trip to Mexico City and other points in Mexico. He was away for about six months.

Dr. M. W. Emmel (Iowa '19), who has been connected with the Michigan Agricultural Experiment Station for the past year, has accepted a position in the College of Veterinary Medicine, Alabama Polytechnic Institute, effective September 1.

Dr. E. C. Hughes (Ind. '16) has relinquished his practice at Carlinville, Ill., and re-entered the service of the U. S. Bureau of Animal Industry. He has been assigned to tuberculosis eradication work in Missouri, with headquarters at Richmond.

Dr. Reese Mitcham (St. Jos. '23), formerly of Seminole, Okla., recently leased the hospital and acquired the good will of Dr. H. E. Rice, of Little Rock, Ark. Dr. Rice, who is one of the oldest practitioners in Arkansas, is confined to his home with a serious illness.

Dr. G. P. Mayer (Chi. '16), who has been in charge of bovine tuberculosis eradication work in Huron County, Mich., with headquarters at Bad Axe, has been transferred to Manistee County, with headquarters at Manistee, in charge of tuberculosis eradication work there.

Dr. N. D. Cash (K. S. A. C. '25) announces that the firm of Drs. Wright and Cash has been dissolved, the co-partnership having terminated May 5, 1930. Dr. Cash is now located at 305 South Bristol St., Santa Ana, Calif. He is now completing plans for a new small-animal hospital.

Dr. E. F. Graves (K. S. A. C. '27), of Juneau, Alaska, Territorial Veterinarian, reports that he recently completed a tuberculin test of 102 dairy herds in the territory of Alaska, consisting of 954 animals. Dr. Graves found 19 (1.2 per cent) reactors. These were destroyed.

Dr. S. E. Hershey (Queen's '98), of Charleston, W. Va., delivered a lecture at the Masonic Open Forum luncheon at the Scottish Rite Cathedral, May 8, illustrated with two moving-picture films, "Clean Hearts and Clean Herds" and "Horse and Man," secured from the U. S. Bureau of Animal Industry.

Dr. Russell A. Runnells (Mich. '16), who has been a member of the staff of the Department of Zoology and Animal Pathology at the Virginia Polytechnic Institute, for several years past, has resigned his position there to accept one at Iowa State College, where he will be connected with the Department of Veterinary Pathology.

Dr. Hubert Shull (Ont. '16), of Texarkana, Ark., in addition to holding the office of City Meat and Milk Inspector, in a municipality which has one set of officers in Arkansas and another in Texas, has had reposed in him, by the public health officials of his city, the responsibility of administering the field sanitation malarial control work.

Dr. Louis D. Mersch (Iowa '28) has resigned his position with the American Society for the Prevention of Cruelty to Animals in New York City, to become full-time executive secretary of the Iowa Veterinary Medical Association, with headquarters in Des Moines. This is the first instance of a state veterinary association employing a full-time secretary.

Dr. A. C. Merrick (O. S. U. '24), of West Jefferson, Ohio, was recently fined \$100 and costs in local court at London, Ohio, for practicing veterinary medicine without a license. Later the fine was suspended upon condition that Dr. Merrick would refrain from further violation of the law. The prosecution was brought at the instigation of the Ohio State Veterinary Medical Association.

Dr. T. B. Hinkle (O. S. U. '12), of Ashley, Ohio, field veterinarian for the Ohio State Department of Agriculture, recently received two serious fractures of the skull when he was attacked by two farmers on whose farm Dr. Hinkle had tested some cattle for tuberculosis and found several reactors. The two farmers were arrested and bound over to the grand jury on charges of assault and battery.